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Vol. XV, No. 3 MARCH, 1926

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

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Published Monthly by the American Pharmaceutical Association: Office of publication, 211 Church St., Easton, Pa. Editorial Office, 10 West Chase Street, Baltimore, Md.

Annual Subscription, $4.00; Single Numbers, 35 Cents.

THE SEVENTY-FOURTH ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN PHILADELPHIA, DURING THE WEEK OF SEPTEMBER 13th. THE BELLEVUE STRATFORD, HEADQUARTERS.

The 1926 Meetings of the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also be held in Philadelphia, same time and place.

For Association Roster, see pages x, xii and xiv.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879.
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THEODORE JAMES BRADLEY

BOSTON, MASS.

President-Elect of AMERICAN PHARMACEUTICAL ASSOCIATION

THEODORE J. BRADLEY.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XV MARCH, 1926 No. 3

THEODORE JAMES BRADLEY.

Theodore J. Bradley, President-Elect of the AMERICAN PHARMACEUTICAL ASSOCIATION, was born at Albany, N. Y., on August 8, 1874, of old Yankee lineage. He received his early education in the public schools of Albany, after which he served an apprenticeship in the drug stores of Louis Sautter and Alfred B. Huested, in his home city. He graduated from the Department of Pharmacy of Union University in 1895, having been registered the previous year as a pharmacist by examination in New York State. Following his graduation he taught pharmacy and chemistry in the Albany College of Pharmacy, chemistry in the Albany Medical College, science and mathematics in Albany Academy, and was chemist to the New York State Departments of Health and Agriculture. While teaching at the Albany College of Pharmacy, he completed a science course at the Rensselaer Polytechnic Institute, receiving the degree of B.S. in 1904. Union University honored him with the M.A. in 1912.

On April 22, 1896, he married Anna R. Peck of Albany, New York. He has three children, Grace H., Willis T., and Theodore, the two older of whom have accompanied him to the ASSOCIATION meetings.

In 1912 he accepted a call as professor of chemistry and dean of the Massachusetts College of Pharmacy, which position he holds at the present time.

Dean Bradley has long been an active worker in pharmaceutical associations. He joined the AMERICAN PHARMACEUTICAL ASSOCIATION in 1896 and ever since has been a loyal and enthusiastic member, serving on many committees both as a member and a chairman. He filled three Vice-Presidencies in three successive years, declining a nomination for the Presidency the following year, because he thought it was time for a retail pharmacist to have the office.

He served as Secretary-Treasurer of the American Conference of Pharmaceutical Faculties from 1917 to 1922, has been a member of the Pharmaceutical Syllabus Committee since 1906, and its chairman from 1917 to date. He has been a member of the Massachusetts State Pharmaceutical Association and the Boston Retail

Druggists' Association for many years, and Past-President of the latter organization for two years.

Professor Bradley is a member of the American Association for the Advancement of Science, American Chemical Society, American Public Health Association, Honorary Society of Sigma Xi, and other scientific and professional organizations.

He is a member of the Kingston Lodge, A. F. and A. M., and has long been a member and officer of musical organizations. His chief hobby is his village farm at Kingston, New Hampshire. H. W. Y.

REVISION COMMITTEE OF NATIONAL FORMULARY IV AT HOT SPRINGS, ARK., SEPTEMBER 3–7, 1908.

The completion of the revision of National Formulary V recalls the membership of its predecessor. In the above picture members in attendance at the Hot

Springs meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, and who were members of the National Formulary Committee are shown; some have ceased their labors, others have added years of service to their records. The group includes:

Seated left to right in front row: H. V. Arny, H. A. B. Dunning, Leonard A. Seltzer; second row, Martin I. Wilbert,† Wilbur L. Scoville,* C. S. N. Hallberg,† C. Lewis Diehl,† Henry P. Hynson;† standing, Leo Eliel,† Charles H. LaWall, George M. Beringer, A. B. Stevens (Honorary President A. PH. A., 1919–1920), Joseph W. England.

Prof. Otto Raubenheimer begins a review of National Formulary V in this number of the JOURNAL.

† Deceased.

* Chairman of Revision N. F. V; C. Lewis Diehl was chairman of N. F. IV Committee.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

THE SEVENTY-FOURTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

THE time for the Philadelphia meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION is drawing near; half of the year since last convention has passed; these months have gone by quickly and quietly, even as a flitting, and the next period will pass even more rapidly for winter is slower than spring. This reminds us of work to be done for the 1926 meeting and we are passing on the reminder to Section officers and members of Committees. The programs of the Sections should be submitted for the July JOURNAL and, therefore, copy should be in the office by the 25th of June; it is understood that additions may be made to the program at a later date, but titles of papers to be included in the Official Program should be sent in by August 1; the coöperation of the Chairmen and Section Officers, House of Delegates and other divisions of ASSOCIATION work is earnestly solicited.

The meeting in Philadelphia promises to be a most important one, for it is probable that preliminary steps will be taken to determine the location of the Headquarters. The U. S. Pharmacopœia X became official January 1, and the National Formulary, now nearing completion, will, probably, also be in force, so that papers and discussions relating to these standards will be subjects of interest in the convention proceedings. It may be assumed that the Sesqui-Centennial celebration will bring to Philadelphia men of prominence in pharmacy from other countries and certainly the event will have an influence on the attendance at the AMERICAN PHARMACEUTICAL ASSOCIATION convention, and also the fact that the annual meeting of the National Association of Retail Druggists will be held during the week following that of the former. September will be a Pharmacy month followed by "Pharmacy Week" in October.

The public should be made better acquainted with the service of pharmacy; many of the activities of pharmacy may be brought to the attention of the laymen in a way that will stimulate a greater interest in the service pharmacists render; not only in a direct way, but to a greater extent by improving the materia medica and otherwise aiding those in the other medical branches so that highest beneficial results may be achieved for the welfare of those served.

Chemistry has been made a popular subject and it has been shown that live pharmaceutical topics attract the public to lectures that deal with source, supply, production and effect of medicines and gives the laymen a helpful understanding.

At the last annual meeting of the National Conference of Pharmaceutical Research a movement was started to prepare for the publication of a book which will acquaint students and the laity with some of the past and present and the possibilities in future activities of pharmacy.

Faculty members of schools of pharmacy have given support to the idea which seems a very timely one and has appealed to retail pharmacists who have been made acquainted with the project and, doubtless, manufacturers and importers can add to the value of such a publication. The suggestion seems to be in line with those

that have been discussed as part of the greater service which the AMERICAN PHARMACEUTICAL ASSOCIATION can render.

A letter which conveys a message has been sent out by Chairman John C. Krantz, Jr., of the Committee to which the proposition was referred, to members of pharmaceutical faculties, and the responses have been quite general and favorable.

The annual meeting of the Conference of Pharmaceutical Research will meet in Philadelphia at the close of the A. PH. A. convention week. The American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy will also hold sessions at that time, and preparation for these events are being made.

It will interest the readers to know that the Life Membership List (credit of thirty-seven years of continuous membership) has been increased by the following:

Albert DeLorenzi, Dallas, Texas; Lewis Flemer, Washington, D. C.; J. Fuller Frames, Baltimore, Md.; Josiah Kirby Lilly, Indianapolis, Ind.; William Mittelbach, Boonville, Mo.; Louis Carl Staudt, Aurora, Ill.; James Walling Westcott, Baltimore, Md.; James Prior Wood, New Haven, Conn.

The ASSOCIATION congratulates these pharmacists and Secretary E. F. Kelly has sent to each of them a certificate of Life Membership, and it is hoped that all of them will enjoy the privileges of full membership for many years to come.

It is a source of gratification to read the letters which have recently been received from contributors to the Headquarters' Fund; not only are the donated amounts welcome, but the spirit evidenced by them heartens all who are doing their very best to bring the great undertaking to realization. The spirit referred to has been in evidence since the very beginning of the movement, all have given cheerfully; it signifies not only a belief in one another but in the mission of pharmacy.

E. G. E.

EXPRESSIONS OF FAITH IN THE A. PH. A. HEADQUARTERS.

THE abstracts following are from letters received since the first of this year; many of the communications were accompanied by full payment of the subscriptions and responsive to a letter of the Chairman of the A. PH. A. Headquarters Campaign Committee, Dr. H. A. B. Dunning. The donors evidence the true spirit of giving and coöperation, and we hope will encourage others to contribute according to their ability, or viewpoint, to what is generally considered one of the greatest, if not the greatest, promotion of American Pharmacists. Action will probably be taken relative to the Headquarters at the Philadelphia meeting, in September.

No further comment is required to impress the messages than those conveyed by the subscribers to the Fund, to whom acknowledgment has been made:

"Enclosed we hand you check for $100.00 to assist in building the Headquarters Building."

"We want to assure you that we hope at a later date to be able to do something to help."

"I am enclosing a check for $100.00, which I trust will be acceptable."

"Kindly enter our subscription for One Hundred Dollars."

"You may enter our subscription for $100.00 for the Pharmacy Headquarters Building project."

"We have carefully noted your statements and appreciate your calling our attention to the matter of subscribing to the Building Fund of the AMERICAN PHARMACEUTICAL ASSOCIATION. We enclose herewith our subscription card, $250.00, which we trust will be satisfactory."

"We enclose herewith check for $500.00, a subscription to the Pharmacy Headquarters Building project. Wishing you every success, we are."

"We enclose herewith our check for $250.00, subscription to the Pharmacy Headquarters Building. This will be our full subscription, as we prefer to make it in a lump sum rather than in ten semi-annual payments."

"We are today sending Mr. E. F. Kelly, Treasurer, a check for $500.00 as our contribution, and extend our best wishes for the success of the plan."

"This refers to your recent letter relative to a subscription to the Pharmacy Headquarters Building project. We are very glad to enclose herewith subscription for $250.00 toward that project."

"Enclosed find a check of one hundred dollars towards the Pharmacy Headquarters Building project. Wishing you success in your noble undertaking."

"I am pleased to enclose herewith our subscription for $100.00. With every good wish to you for success in your unselfish endeavor to make this dream a reality, I am."

"Please find enclosed our check for $250.00 which is our contribution to the permanent headquarters building for the AMERICAN PHARMACEUTICAL ASSOCIATION. We think this is a splendid undertaking and that the new headquarters will fill a want that has been greatly felt in the pharmaceutical world. Needless to say we wish you and your associates every success."

"We take pleasure in enclosing our subscription for One Hundred Dollars for the fund for erecting a permanent headquarters for the AMERICAN PHARMACEUTICAL ASSOCIATION. Trusting you will be able to secure the full quota for which you are striving, we are."

"Replying to your letter of January 25, enclosed please find our check for $200.00 as a subscription to the AMERICAN PHARMACEUTICAL ASSOCIATION'S Headquarters Building project."

"I am enclosing my check for $100.00 for the Pharmacy Headquarters Building project. I am a little bit ashamed to send it after waiting so long, and I guess it was your recent letter, addressed to me personally, that aroused me from my inertia, and got the present action from me. I trust that the project will be altogether as successful and beneficial as those who are behind it, and have done so much to put it through, anticipate."

First Aid Week—March 15-20.

SCIENTIFIC SECTION

THE MICROTITRATION OF IODIDES WITH IODATE AND THE DETERMINATION OF THE IODIDE AND FERROUS IRON CONTENT IN SYRUP OF FERROUS IODIDE.*

BY I. M. KOLTHOFF.

The following is a summary of an investigation on the above-named subject which was published in detail in the *Pharm. Weekblad*. Within the past few years R. Lang[1] published some new iodometric methods which are based on the formation and titration of iodine-cyanide. In principle the method is based on the fact that iodide is oxidized by a strong oxidant to iodine, whereas in the presence of hydrocyanic acid the oxidation goes further to the colorless iodine-cyanide. The reaction may be represented by the following electro-chemical equations:

$$2\,I^- \longleftrightarrow I_2 + 2\ominus \qquad \text{(absence of HCN)}$$
$$I^- \longleftrightarrow I^+ + 2\ominus \qquad \text{(presence of HCN)}$$

The positive iodine ion reacts with HCN:

$$I^+ + HCN \longleftrightarrow ICN + H^-$$

In reality the reaction is much more complicated. We have during the titration present in the liquids the following: iodine-cyanide, iodide and hydrogen ions, which react in the following manner:

$$ICN + H^- + I^- \longleftrightarrow I_2 + HCN$$

Hence during the titration of an iodide in the presence of hydrogen-cyanide with a strong oxidant, the liquid contains iodide as well as iodine, and it will produce a blue coloration with starch solution. This blue color disappears just at the end-point where all the iodide is oxidized to iodine-cyanide. The most suitable oxidant for the titration, even for traces of iodide, is iodate. Potassium iodate is readily obtainable in pure state by recrystallization from water, and serves as an ideal standard. The reaction between iodate, iodide and cyanide in acid solution may be represented by the equations:

$$IO^-_3 + 2I^- + 3\,HCN + 3H^- \longleftrightarrow 3ICN + 3H_2O$$

Hence in this case the equivalent weight of iodate is half the molecular weight, whereas in the ordinary iodometric titration it is $^1/_6$ of the molecular weight. The titration gives the best results when it is carried out in a medium that contains 1 to 1.2 normal hydrochloric acid.

To 10 cc. of a 0.1 molar iodide solution is added 80 cc. of water, 20 cc. 25% hydrochloric acid and 4 to 5 cc. 10% potassium cyanide solution. The titration is performed in a long neck, glass-stoppered flask, $^1/_{60}$ molar (or more dilute) iodate is added until the blue color of the added starch solution just disappears. The color change is extremely sharp.

---

* Scientific Section A. PH. A., Des Moines meeting, 1925.

[1] R. Lang, *Z. anorg. allgem. Chem.*, 122, 332 (1922); 142, 229, 279 (1925); 144, F5 (1925).

Taken cc. KI.	Added bromide.	Used 1/60 molar KIO_3.	Calculated.
		30.00 cc.	
10 cc. 1/10 molar	—	29.98 cc.	30.00
		29.98 cc.	
10 cc. 1/10 molar	1 Gm.	30.02 cc.	30.00
10 cc. 1/10 molar	2 Gm.	30.02 cc.	30.00
10 cc. 1/10 molar	10 Gm.	30.03 cc.	30.00

These results agree with those of Lang. I find absolute correct results in the presence of large amounts of bromide, though the end-points in the case of bromines were somewhat slowly reached.

For the titration of more dilute iodide solutions, the above method does not give very accurate results, especially in the presence of bromides. In very dilute iodide solutions the color change appears too early.

Therefore, I improved the method and did not use starch as an indicator, but added carbon tetrachloride (or chloroform). The iodate was added until the violet color in the carbon tetrachloride layer just disappeared. Under these conditions the method gives absolutely correct results, even in the presence of large quantities of bromide.

I succeeded in titrating 100 cc. of liquid that contained as little as 0.127 mg. iodide with an accuracy of 1%. As far as I know, we have at present no method that gives such accurate results in these high dilutions.

Since the determination of traces of iodine is of considerable importance with respect to goiter, I suggest trying the method given above for the titration of iodides in salts, brines, water, foodstuffs and so forth.

However, when there are present other substances, which are oxidized by iodate in strongly acid solution, the method cannot be applied directly. Use of the reverse titration to oxidize the iodine to iodate and to titrate the latter with iodide is suggested.

The oxidation of iodide to iodate is done rapidly with a solution of hypochlorous acid in a medium of acetic or succinic acid. The excess of chlorine is boiled off and the liquid is ready for titration. Hydrochloric acid is added until the concentration is about 1 *N;* and there is titrated with a standardized iodide solution, until the carbon tetrachloride layer is just colored violet. Under these conditions I was able to titrate as little as 0.1 mg. of iodine in 100 cc. liquid with an accuracy of 1 per cent.

The method described above cannot be applied for the determination of iodide in syrup of ferrous iodide, as the ferrous iron is slowly oxidized by the iodate. Instead of using the latter oxidant we may advantageously employ potassium permanganate. When starch is used as an indicator, the coloration appears (about 1 or 2%) too early in the presence of iron. Therefore, it is better to titrate, until the pink color of permanganate is visible. Under these conditions the iodide is oxidized to iodine-cyanide and the ferrous to ferric iron. Hence we find the sum of both. The iodine-cyanide itself also is an oxidant, and it reacts in acid solution with iodide in forming iodine.

$$ICN + I^- + H^+ \longleftrightarrow I_2 + HCN$$

In order to prevent a disturbing action of the ferric iron, this titration must be

done in a medium of phosphoric acid. In this solution the ferric ions are bound in a complex form, and do not react with iodide.

Therefore, if we wish to titrate iodide and ferrous iron together, the titration is done in the following way.

To 10 cc. of the liquid to be titrated is added a mixture of 80 cc. water, 10 cc. 25% phosphoric acid and 5 cc. 10% potassium cyanide.[1] Then 0.1 *N* potassium permanganate is added, until the liquid appears pink colored.

Then an excess of iodide is added, and the liberated iodine is titrated with thiosulphate, using starch as an indicator. If the permanganate number is A cc. 0.1 *N*, and the thiosulphate number B cc. 0.1 *N*, we have:

Iodide Content:	B × 12.69 Mg.
Ferrous Content:	(A − B) × 5.58 Mg.

Sucrose has but a very small disturbing effect in the titration with permanganate and therefore the method is recommended for a simple, rapid method for the titration of iodide and ferrous iron in syrup of ferrous iodide. Especially in scientific investigations, where the air and light decomposition is studied of a liquid containing ferrous iron and iodide, the method given above is of distinct advantage.

SUMMARY.

(1) The method of Lang is improved for the determination of traces of iodide with iodate as a reagent.

(2) The method of Lang is applied for the titration of iodide and ferrous iron in syrup of ferrous iodide.

PHARMACY LABORATORY OF THE UNIVERSITY,
UTRECHT (HOLLAND) July 1925.

ISOPROPANOL AS A SUBSTITUTE FOR ETHANOL I. THE DETERMINATION OF SAPONIFICATION NUMBERS.*

BY H. A. SCHUETTE AND LOYD E. HARRIS.

Isopropanol is a member of the alcohol family whose appearance in the commercial field, either as a contribution from the petroleum-refining industry or as a foreign-made synthetic product,[1] has some interest to the pharmacist.

Fuller reported that not only is it superior to ethyl alcohol as a solvent but that it has greater antiseptic and disinfectant properties as well. He suggested[2] that the pharmaceutical profession has access to a solvent that might be capable

---

[1] The potassium cyanide must not be added to the acidified mixture, which contains the ferrous iron, as there is formed a local excess of ferro-cyanide, and the liquid turns blue by air oxidation.

* Read before Scientific Section, A. PH. A., Des Moines meeting, 1925. A contribution from the Laboratory of Foods and Sanitation, Department of Chemistry, University of Wisconsin.

[1] Anon, *Ind. Eng. Chem.*, 17, 822 (1925).

[2] JOUR. A. PH. A., pp. 1081–4, (December 1923).

of solving some of its most exasperating problems. This alcohol possesses also many possibilities from the analytical side, and it is the purpose of this paper to report on some experiments made with the view of demonstrating that it can be substituted without sacrifice of accuracy or convenience for other alcohols, particularly the ethyl form. When pure it is a colorless liquid possessing an odor decidedly more pleasant than its higher homologues and lacking their irritating qualities. It is not at all unpleasant to work with. Its boiling point does not lie much above that of ethanol and, like the latter, it is freely viscible with water in all proportions but it rectifies with greater ease. It will dissolve potassium hydroxide, but the carbonate is poorly soluble in it. It is also a good solvent for volatile oils, fatty oils, waxes, resins, etc.

Henriques[1] suggested some years ago that the saponification of a glyceryl ester by alcoholic potash proceeds in at least two steps, the first of which is the transposition of the glyceride into an ethyl ester, which is in turn saponified. Anderson and Pierce[2] elaborated on this idea and from their studies on the rates of saponification of an acetate in the presence of aliphatic alcohols it appears that with an increase in molecular weight among the monohydric alcohols that there is an increase in the velocity at which saponification takes place. On the basis of these facts Reid and his associates[3] demonstrated that normal butanol is an excellent medium in which to conduct the quantitative saponification of esters and found it to be superior to ethanol, for with its use they were able to very readily obtain satisfactory results and often without the use of any special precautions. Winkler[4] had previously called attention to the merits of propanol for the same purpose. In our case, *a priori* reasoning might have justified a statement of our conclusions without experimental evidence in at least one phase of this work, yet it seemed worth while to actually secure the necessary data in substantiation of any claims made. The investigation divided itself into two parts, the latter forming the subject of another paper.

1. Materials.—A commercial grade of isopropanol, "Petrohol," was treated with lime and distilled, that fraction boiling at 81.3° C. (unc.) being cut out for use. It was not water-free nor is it particularly desirable from theoretical grounds[5] that it be so for the purpose for which the alcoholic potash solution was subsequently to serve.

2.—Alcoholic potash solutions were prepared with the purified isopropanol and with ethanol purified with freshly precipitated silver hydroxide according to the procedure of Dunlap.[6] In each case forty grams of potassium hydroxide were dissolved in the alcohol and the volume made up to one liter. The precipitated potassium carbonate was removed by filtration. It is of interest to record here that whereas the ethanol solution turned a yellowish brown on standing, the isopropanol solution developed only a faint yellow color. From the analyst's view-

[1] *Z. angew. Chem.*, 338 (1898).
[2] *J. Phys. Chem.*, 22, 51 (1918).
[3] *Ind. Eng. Chem.*, 12, 129, 481 (1920).
[4] *Z. angew. Chem.*, 24, 638 (1911).
[5] Reid, *et al.*, *loc cit.*
[6] *Jour. Am. Chem. Soc.*, 28, 395 (1906).

point, the ready preparation of so-called "water-white" solutions of this character is certainly a boon.

3.—As experimental material there were used four fatty oils, two waxes and two volatile oils. They were found to have the analytical constants as recorded in the following table. We believe them to be unadulterated.

TABLE I.—ANALYTICAL CONSTANTS OF EXPERIMENTAL MATERIAL.

	Index of refraction.			Iodine number (Hanus).			Acidity as
Substance.	Found.	Recorded.		Found.	Usual limits.		oleic.
Olive Oil	$1.4670^{25°}$	$1.4659–1.4685^{25°}$	(1)	79.4	77–95 ,	(1)	..
Cottonseed Oil	$1.4701^{25°}$	$1.4698–1.4723^{25°}$	(1)	109.1	104–117	(1)	..
Cocoanut Oil	$1.4485^{40°}$	$1.4474–1.4495^{40°}$	(1)	8.9	8–9.5	(1)	..
Lard Oil	$1.4652^{25°}$	$1.4620–1.4660^{25°}$	(1)	66.0	67–88	(1)	16.9
White Wax	$1.4415°$	$1.4415°$	(2)	...	.....		..
Cetaceum	$1.4336°$	$1.4334°$	(2)	...	.....		..
Oil of Wintergreen (Synthetic)	$1.5360^{20°}$	$1.5379^{20°}$	(4)	...	.....		..
Oil of Peppermint	$1.4615^{20°}$	$1.4636–1.4643^{20°}$	(5)	...	.....		..

(1) Leach, "Food Inspection and Analysis," 4 ed., 528 (1920).
(2) Thurston, "Pharmaceutical and Food Analysis," 151 (1922).
(3) *Ibid.*, 156.
(4) *Ibid.*, 383.
(5) *Ibid.*, 352.

EXPERIMENTAL.

Saponification numbers of the fatty oils and waxes were determined according to the official method[1] of the Association of Official Agricultural Chemists. The volatile oils were assayed by the method of the U. S. P. IX. The reaction between the oils and the isopropanol-potash solution began almost immediately upon the addition of the saponifying agent and proceeded very smoothly. This suggests the thought that the usual thirty-minute saponification period, or "until completely saponified," may be materially shortened if isopropanol is to be used as the medium in which the reaction is to be conducted. The addition of the first few cubic centimeters of 0.5 normal hydrochloric acid solution to the resulting soap solution, in the titration of the excess of alkali, caused a slight cloudiness but this soon disappeared on the subsequent addition of more of the acid solution.

RESULTS.

In the following table we have recorded only averages, duplicate determinations in every case having fallen within the usual small range of experimental error. For purposes of comparison there have also been included the accepted values for authentic samples of the material in question. It is to be noted that all the values obtained are well within the limits for pure oils. For the fatty oils values were obtained by the isopropanol procedure which are between 0.2 and 0.3 per cent higher than those given with ethanol. The values for cetaceum were about 0.6 per cent higher for the isopropanol saponification and that for the white beeswax fell about 0.4 per cent short. The ester content of the ethereal oils both fell short of those obtained by the ethanol procedure.

It appears from these experiments that the values obtained when ethanol and propanol are used as saponifying mediums are substantially the same. The ad-

[1] "Methods of Analysis, A. O. A. C.," 2 ed., 288 (1925).

vantages gained by using the latter are (1) rapid saponification, (2) a reagent apparently less subject to the disturbing effect of aldehyde resinification, and finally, (3) a chemical is available around which no legal restrictions as to sale or use have been thrown.

TABLE II.—SAPONIFICATION NUMBERS OF FATTY OILS AND WAXES AND ESTER CONTENT OF VOLATILE OILS.

Substance.	Saponification number. Ethanol KOH.	Isopropanol KOH.	Recorded values.	Ester content. Ethanol KOH.	Isopropanol KOH.	U. S. P. IX.
Olive Oil	191.9	192.3	185–196 (1)	..	..	.....
Cottonseed Oil	190.5	191.2	193–195 (2)	..	..	.....
Cocoanut Oil	254.7	255.5	246–260 (3)	..	..	.....
Lard Oil	193.1	193.7	190–198 (4)	..	..	.....
White Wax	93.6	93.2	90– 98 (5)	..	..	.....
Cetaceum	127.0	127.8	123–135 (5)	..	..	.....
Oil of Wintergreen (Synthetic)	...	...	.....	98.4	98.1	Not less than 98
Oil of Peppermint	...	...	.....	13.0	12.4	Not less than 5

(1) Lewkowitsch, "Chemical Technology and Analysis of Oils, Fats and Waxes," 6 ed. Vol. I, 397 (1921).

(2) *Ibid.*, 396.

(3) *Ibid.*, 399.

(4) Leach, *loc. cit.*, 528.

(5) Lewkowitsch, *loc cit.*, 400.

SUMMARY.

Isopropanol may be substituted without sacrifice of accuracy or convenience for ethanol as a medium in which to conduct the quantitative saponification of fats, oils and waxes.

ISOPROPANOL AS A SUBSTITUTE FOR ETHANOL. II. THE TITER TEST.*

BY H. A. SCHUETTE AND LOYD E. HARRIS.

The present recognized methods[1] of the Association of Official Agricultural Chemists for determining the so-called titer test or solidifying point of the mixed insoluble fatty acids of fats and oils are two, namely the modified Dalican procedure in which either an alcoholic or an aqueous solution of sodium hydroxide is used as the saponifying agent and the more recent glycerol-potash procedure. There is not much to choose from between the titers obtained by either method, for they are substantially the same. Choice of saponifying medium at the present day, no doubt, favors glycerol, although it is not improbable that a denatured ethyl alcohol containing some methanol, for example formula number 30, offers possibilities as a substitute for 95 per cent ethanol in this case. For reasons[2] which we have already pointed out, higher homologues of ethanol are to be preferred for conducting saponifications. They are good solvents for fats, oils, and waxes, which property admits

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* Read before the Scientific Section, A. PH. A., Des Moines meeting, 1925. A contribution from the Laboratory of Foods and Sanitation, Department of Chemistry, University of Wisconsin.

[1] "Methods of Analysis," A. O. A. C. 2 ed., 285 (1925).

[2] See this issue of the JOUR. A. PH. A.

of lower saponifying temperatures. Overheating, with a resulting scorching of the soap, thereby becomes a negative consideration.

Experiments made in this laboratory[1] showed that no consequential difference in the titer test of fats and oils results when the latter are saponified with sodium butoxide in butanol. Objections to the practical use of this observation can only be based on the irritating fumes of the butanol and probably to the cost of the solvent in quantity routine work. Such objections do not apply to isopropanol which is not at all unpleasant to work with. Its odor is described as being rather mild.

For the purpose of conducting the investigation herein recorded, comparative titer tests were made on the fatty acids prepared by the glycerol potash method with those in which isopropanol was substituted for ethanol. Saponifications were conducted on a steam-bath, which at once eliminated a precaution necessary in the glycerol potash procedure where it is required to keep the temperature at a point very near 150° C., when the isopropanol solution was used.

EXPERIMENTAL.

1. Materials.—Nine fats and oils were selected for this study. They were olive, menhaden, cottonseed, soya bean, cocoanut, and lard oils, and oleo stearin, oleo oil, and a tallow. With the exception of the last three, which is rather to be expected since they are manufactured products whose composition can be varied almost at will, all possessed analytical constants lying within the range of samples of known history. Their analysis is recorded in Table I.

2. Glycerol-potash Solution.—The solution recommended by the Association of Official Agricultural Chemists[2] was prepared. It consists of 25 grams of potassium hydroxide in 100 cc. of U. S. P. glycerol.

3.—A practically saturated solution of potassium hydroxide in isopropanol was prepared. The alcohol had been dehydrated over lime and had a boiling point of 81.3° C. (unc.). Titration against a standard acid solution showed the saponifying agent to contain 7 grams of potassium hydroxide per 100 cc. of solution. A normal solution of potassium hydroxide was found to readily saponify all the oils except cocoanut oil. Attempts to prepare a sodium hydroxide solution lead only to one whose strength was 0.7 normal which was found to be inefficient for saponification within the limits of time, size of sample and quantity of saponifying agent set for our experimentation.

Note.—A number of possibilities were tried in order to ascertain the best saponifying solution using isopropanol as solvent. A molar solution of sodium in this alcohol was prepared with the aid of heat but when the isopropoxide was cooled to room temperature it congealed. Saponification was attempted with it, however, using 150 cc. of the warmed and liquified solution to 50 cc. of olive oil. After heating on the steam-bath for three hours it was found that the reaction was not complete. Half-molar sodium isopropoxide which remains a liquid at ordinary temperatures was also tried, using the same proportions, but without satisfactory results.

1. Apparatus.—Standard thermometer.—The prescribed official titer thermometer[3] was used. It was calibrated against one of known accuracy.

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[1] Unpublished thesis of J. H. Draize, University of Wisconsin, 1922.

[2] *Loc. cit.*

[3] *Loc. cit.*

2. Titer Tube.—An unsilvered Dewar flask of 50-cc. capacity was used in place of the calorimeter which usually serves in this test. The latter is made by placing a tube, 25 by 100 mm. into a 16 oz. wide-mouth bottle. The dimensions of the inner tube of the Dewar flask were substantially those as given above.

Preparation of Insoluble Fatty Acids.—The fats and oils were saponified in duplicate. In one case soaps were made by the official glycerol-potash procedure and in the other by the following which was developed as a result of numerous trials made to determine the optimum conditions for readily and completely saponifying all the fats and oils used in this study. We believe that it is applicable to all classes of fatty oils inasmuch as a representative group had been selected for study.

Fifty cc. of oil or melted fat and 175 cc. of the isopropanol-potash solution (7 grams in 100 cc. of the alcohol) were heated for 30 minutes on a steam-bath in a 500-cc. round-bottom flask which had been provided with a reflux condenser. After saponification about two-thirds of the alcohol was recovered by distillation, water added to the residue and the solution poured into a large metal crucible. The mixture was heated on the steam-bath, with occasional stirring, until the odor of isopropanol had disappeared. Finally this soap was transferred to an 800-cc. beaker containing 500-cc. of boiling water and the solution boiled to remove whatever alcohol might not have escaped before.

The fatty acids were liberated in each case by the careful addition of 50 cc. of dilute sulphuric acid (1 + 3). They were then washed repeatedly with boiling water to remove the mineral acid. The fatty acids so purified were dried for 20 minutes in an oven at 100° C., transferred to the titer tube, and the titer taken as directed by the official method. The only new feature which was introduced was the use of a more efficient titer tube.

The proximate composition of the mixtures of insoluble fatty acids, which were obtained by following the glycerol-potash method of saponification on the one hand and the isopropanol-potash method on the other, was then compared by making a determination of the iodine number, the melting point, and the index of refraction. Iodine numbers were determined by the method of Hanus and the melting points by the capillary tube method.[1]

RESULTS.

That the composition of the resulting mixed insoluble fatty acids is substantially no different from that obtained by the glycerol or by the isopropanol methods of saponification is apparent from the practical concordance of the melting point, titer test, index of refraction, and iodine absorption values which follow. Except for the titer test, averages only are recorded, for which see Table II. There have also been incorporated into a third table such titer tests and melting points, pertinent to this investigation, which we have been able to find in the literature. With the exception of oleo stearine and tallow, whose histories are obscure, the values found by us fall within the published limits.

The above results show, we believe, that no consequential difference in the titer test occurs with a change of method of saponification of the fat or oil in question. The use of an isopropanol-potash solution eliminates the careful observation

[1] "Methods of Analysis," A. O. A. C., 2 ed., 284 (1925).

and constant stirring of the other saponifying procedures. The danger of scorching the soap is also removed and with it the possibility of a low titer test.[1] Saponification is more rapid, a consideration to be taken into account in routine quantity work.

SUMMARY.

Isopropanol-potash has been shown to possess possibilities as a substitute for glycerol-potash, or for alcoholic potash (ethanol), in the saponifications preliminary to the determination of the solidifying point of the insoluble fatty acids of fats or oils. It is a safe and rapid reagent to work with.

TABLE I.—ANALYTICAL CONSTANTS OF FATTY OILS.

Fatty oil.	Index of refraction. Found.	Index of refraction. Usual limits.	Iodine number (Hanus). Found.	Iodine number (Hanus). Usual limits.	Acidity as oleic.
Olive	$1.4670^{25°}$	$1.4659–1.4685^{25°}$	79.4	77– 95	..
Menhaden	$1.4770^{25°}$	.....	135.9	145–170[1]	..
Cottonseed	$1.4701^{25°}$	$1.4698–1.4723^{25°}$	109.1	104–117	..
Soya Bean	$1.4732^{25°}$	$1.4729–1.4742^{25°}$	128.8	121–143	..
Cocoanut	$1.4485^{40°}$	$1.4474–1.4495^{40°}$	8.9	8– 9.5	..
Lard Oil	$1.4652^{40°}$	$1.4620–1.4660^{25°}$	66.0	67– 88	16.9
Oleo Stearin	$1.4600^{40°}$	$1.4524–1.4580^{40°}$	42.95	8 –27	..
Oleo Oil	$1.4525^{50°}$	$1.4573–1.4593^{40°}$	12.4	40– 50	12.7
Tallow	$1.4480^{60°}$	.....	15.8	.....	..

All references are to Leach, "Food Inspection and Analysis," 4 ed., 528 (1920) unless otherwise stated.

[1] Lewkowitsch, "Chemical Technology and Analysis of Oils, Fats and Waxes," 6 ed., Vol. II, 426 (1921).

TABLE II.—COMPARISON OF TITER TESTS, INDICES OF REFRACTION, MELTING POINTS, AND IODINE NUMBERS OF INSOLUBLE FATTY ACIDS.

Saponifying medium. Fatty acids from.	Glycerol potash. Index of refraction.	Glycerol potash. Iodine number (Hanus).	Glycerol potash. Melting point, ° C.	Glycerol potash. Titer tests, ° C.	Isopropanol potash. Index of refraction.	Isopropanol potash. Iodine number (Hanus).	Isopropanol potash. Melting point, ° C.	Isopropanol potash. Titer tests, ° C.
Olive Oil	1.4530[2]	85.5	29.8	26.8	1.4523[2]	85.8	29.8	26.65
				26.7				26.6
Menhaden Oil	1.4650[2]	137.5	33.1	29.7	1.4642[2]	137.3	33.0	29.3
				29.6				29.4
Cottonseed Oil	1.4550[2]	110.2	38.4	33.2	1.4542[2]	110.2	38.2	33.15
				33.6				33.05
Soya Bean Oil	1.4650[1]	130.6	22.8	21.6	1.4645[1]	130.9	22.8	21.4
				21.6				21.3
Cocoanut Oil	1.4351[2]	9.0	25.2	23.5	1.4350[2]	9.1	25.1	23.45
				23.55				23.5
Lard Oil	1.4525[2]	66.5	37.3	34.3	1.4495[2]	67.2	37.4	34.6
				34.3				34.45
Oleo Stearin	1.4435[3]	48.0	43.7	41.0	1.4450[3]	47.8	43.8	41.15
				40.8				41.2
Oleo Oil	1.4430[3]	16.3	42.6	40.2	1.4425[3]	16.2	42.5	39.55
				40.2				39.6
Tallow	1.3950[4]	16.2	53.0	51.4	1.4400[4]	16.3	53.1	51.7
				51.55				51.75

[1] At 25° C. [2] At 40° C. [3] At 50° C. [4] At 60° C.

[1] *U. S. Bur. Chem. Circ.*, 22 (1904).

TABLE III.—MINIMUM AND MAXIMUM RECORDED TITER TESTS, MELTING POINTS, IODINE NUMBERS, AND REFRACTIVE INDICES OF INSOLUBLE FATTY ACIDS.

Fatty acids.	Titer test. Min., °C.	Titer test. Max., °C.	Melting point. Min., °C.	Melting point. Max., °C.	Iodine number. Min.	Iodine number. Max.	Refractive index at 60° C.	
Olive Oil	17.2[1]	27.0[2]	19.2[5]	31.0[5]	86.1	90.2[5]	1.4528[5]	..
		26.4[1]					1.4410[4]	
Cottonseed Oil	28.5[3]	38.5[2]	34.0[7]	40.0[7]	105	115[7]	1.4460[7]	..
Soya Bean Oil	22.5[2]	25.0[2]	26.0[3]	29.0[3]	122[6]		1.465	27.5°[6]
Cocoanut Oil	21.5[2]	26.0[2]	24.0[3]	27.0[3]	8.3	9.3[8]	1.4295[8]	..
Lard Oil	34.5[2]	39.5[2]	..	..	..	...	....	..
Oleo Stearin	48.0[3]	51.0[3]	..	..	..	...	....	..
Tallow (Beef)	43.0[9]	45.0[9]	43.0[7]	47.0[9]	25.9	41.3[9]	1.4375[9]	..

[1] Lewkowitsch, *loc. cit.*, Vol. I, 517.
[2] Fryer and Weston, "Oils, Fats and Waxes," Vol. I, 70 (1918).
[3] Leach, *loc. cit.*, 528.
[4] Lewkowitsch, *loc. cit.*, 519.
[5] *Ibid.*, Vol. II, 351.
[6] *Ibid.*, 119. [7] *Ibid.*, 197. [8] *Ibid.*, 659. [9] *Ibid.*, 779.

THE PREPARATION OF TRIBROMHYDRIN AND PROPADIENE.*

BY M. W. TAPLEY AND P. M. GIESY.

In the course of the research on anesthetics being carried out by our laboratories it was desired to make sufficient propadiene for physiological investigation. Upon looking up the literature, the most feasible method for our purposes was found to be that of Gustavson and Demjanoff.[1] This method requires 1,2-dibrompropylene which, in turn, is prepared from tribromhydrin (1,2,3-tribromopropane).

Most methods of preparing tribromhydrin require heating at an elevated temperature in a sealed tube, the best method being that of Kronstein.[2] In this method a mixture of propylene dibromide with bromine in the presence of iron wire is heated in a closed tube in a water-bath for two hours. The resulting reaction gives an almost quantitative yield of tribromhydrin. The method has, however, the drawback of requiring the reaction to be carried out in a bomb tube, which was highly undesirable from a laboratory point of view. To avoid this the following modified method was evolved:

A mixture of 200 Gm. of propylene dibromide and 300 Gm. of bromine was placed in a 500-cc. round-bottom reaction flask and a small bundle of iron wire (20 Gm. of card teeth) added. The flask was then gently heated under a reflux condenser with the free flame, the heating being gradually increased until hydrobromic acid was no longer evolved. This required from one to two hours. The resulting mixture was distilled under vacuum and then redistilled at atmospheric pressure. The fraction boiling from 219° to 221° C. was collected. Yield, 78% of the theoretical, based on tribromhydrin.

The conversion of tribromhydrin into 1,2-dibrompropylene was accomplished by the method of Gustavson and Demjanoff,[1] which consists in dropping small

* Read before Scientific Section, A. PH. A., Des Moines meeting, 1925.
[1] *J. Prakt. Chem.*, [2] 38, 202 (1888).
[2] *Ber.*, 24, 4246 (1891).

portions of tribromhydrin into a flask containing powdered potassium hydroxide. The flask is heated in an oil bath kept at 145° to 150° C., and at this temperature the reaction is complete. The oil is then steam-distilled by cooling the reaction flask to 130° C., adding water, and distilling. Upon redistilling the oil, the fraction boiling between 139° and 141° C. is collected. The yield as given by Gustavson is one-fifth of the original tribromhydrin used. In our work a 28% yield was obtained.

Propadiene is readily made by dropping 1,2-dibrompropylene into a flask containing zinc dust and 80% alcohol. The flask is heated on a water-bath under a reflux condenser. The apparatus used was essentially that described by us in connection with the preparation of methyl acetylene.[1] A 76% yield of pure propadiene was obtained. Twenty Gms. of the dibrompropylene gives about two liters of propadiene.

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THE CHEMISTRY OF NITROSYL CHLORIDE.*

BY E. V. LYNN AND H. A. SHOEMAKER.

The remarkable stability of nitrosyl chloride, coupled with the contradictory fact that it easily reacts with numerous substances, makes the subject of its chemical behavior decidedly interesting. There is probably no known compound which provides a greater variety of reactions compared to the simplicity of its structure and to the resistance shown toward decomposition by physical agencies. Furthermore, few organic or inorganic compounds fail to react with nitrosyl chloride in some way or other. We are presenting this short review of the known facts as introductory to an extensive investigation of its general behavior.

Nitrosyl chloride has been prepared in a variety of ways,† all depending upon the reaction of chlorine or of a chloride with an oxide or acid of nitrogen or with some simple nitrogen derivative. Undoubtedly most of these are meritorious and efficient for certain purposes, but the best practical method for general use is the reaction of nitrosyl sulphate upon sodium chloride.[9] The former can easily be produced by saturating sulphuric acid with the vapors from aqua regia or by heating a mixture of nitric and sulphuric acids with sulphur, the latter being a modification of a method by Girard and Pabst.[23]

So manufactured, nitrosyl chloride is a reddish brown gas with a characteristic odor, condensing to a dark red liquid boiling[74] at —5.8° C., and solidifying to blood red crystals[46] melting at[49] —60° to —61° C. The liquid has a specific gravity[29] of 41.165 at —12° C., and a critical temperature[49] of 163–4° C. The absorption spectrum has been investigated by Manganini.[33] Other physical constants are given in the references cited. The vapor pressure agrees with the formula NOCl at all temperatures up to 700° but above this it rapidly becomes dissociated[34,35]

[1] Tapley and Giesy, JOUR. A. PH. A., February 1926, p. 115.

* Scientific Section, A. PH. A., Des Moines meeting, 1926.

† See references, 2, 3, 4, 5, 7, 9, 12, 15, 23, 26, 27, 28, 29, 33, 41, 47, 50, 53, 55, 59, 60, 61, 63, 64, 69, 73, 75.

until at 985° it is nearly 50 per cent decomposed into nitric oxide and chlorine. It is thus seen that nitrosyl chloride is one of the most stable of nitrogen compounds.

Water decomposes it without the formation of gas in the same way as acetyl chloride,

$$NOCl + H_2O \rightarrow HONO + HCl$$

The mechanism of this hydrolysis has been examined by Noyes.[76] Bases form chlorides and nitrites. Sulphuric acid reacts to give nitrosyl sulphate and hydrogen chloride. Some, but not all, of the metals and their oxides are converted into chlorides, setting free nitric oxide, the salts thus formed in many cases combining with more nitrosyl chloride to stable molecular addition products, which are decomposed by water with the formation of nitric oxide and hydrogen chloride.[1,9,14,36,46,71] Thus tin or stannic chloride react

$$Sn + 6NOCl \rightarrow SnCl_4.2NOCl + 4NO$$
$$SnCl_4 + 2NOCl \rightarrow SnCl_4.2NOCl$$

The most interesting reactions, however, are those with organic compounds. In general these may be divided into three groups: addition; condensation with

$$=(NO)-C(Cl)=$$

the elimination of water; condensation with the formation of hydrogen chloride.

(1) $=C=C= + NOCl \rightarrow =C(NO) - C(Cl)=$
(2) $RH_2 + ONCl \rightarrow RNCl + H_2O$
(3) $RH + ClNO \rightarrow RNO + HCl$

Secondary reactions may modify these types considerably.

The addition to unsaturated compounds has been known for many years[15] and is of great assistance to investigation of the volatile oils and their components, having been developed chiefly through the work of Wallach and of Baeyer. The true nitroso compounds which are blue are but seldom obtained as the product because they rearrange to isonitroso compounds or oximes. Upon hydrolysis the latter give hydroxylamine and a ketone or aldehyde.

$$R.CH(NO).CH(Cl)R \rightarrow R.C(=NOH).CH(Cl)R \rightarrow NH_2OH + R.C(=O).CH(Cl)R$$

The primary amines react by true condensation[42,43,44] forming water and a diazo compound, which in the case of the alkyl amines, decomposes giving nitrogen

$$R.NH_2 + NOCl \rightarrow H_2O + R.N=N.Cl \rightarrow RCl + N_2$$

Thus urea forms phosgene and propyl amine forms propyl chloride. As far as can be learned, no other compounds have been found to condense with nitrosyl chloride through the oxygen group.

The splitting out of hydrogen chloride is much more common. Phenol,[10] acetanilide,[10] dimethyl aniline[12,13], and ethyl aniline [11] react in para position to give a nitroso compound

$$C_6H_5.N(CH_3)_2 + NOCl \rightarrow NO.C_6H_4.N(CH_3)_2$$

Secondary amines[44] form nitrosamines

$$R_2NH + NOCl \rightarrow R.N.NO + HCl$$

while acetone[28] and acetophenone[28] form nitroso and, by rearrangement, isonitroso derivatives

$$CH_3.CO.CH_3 \rightarrow CH_3.CO.CH_2NO \rightarrow CH_3.CO.CH{=}NOH$$

Mercaptan[54,57] reacts in a similar way to give an unstable nitroso compound,

$$RSH \rightarrow RSNO \rightarrow (RS)_2 + NO$$

Recently one of us has shown[56,67] that the paraffin hydrocarbons condense with nitrosyl chloride in the sunlight to form nitroso compounds and then oximes by rearrangement, hydrolysis of the latter giving the corresponding ketones. Thus *n*-heptane forms dipropyl ketone,

$$(CH_3.CH_2.CH_2)_2CH_2 \rightarrow (CH_3.CH_2.CH_2)_2CHNO \rightarrow (CH_3.CH_2.CH_2)_2C{:}NOH \rightarrow (CH_3.CH_2.CH_2)_2C{:}O$$

Later[72] he found that toluene gave in a similar way benzaldehyde,

$$C_6H_5.CH_3 \rightarrow C_6H_5.CH_2NO \rightarrow C_6H_5.CH{:}NOH \rightarrow C_6H_5.CH{:}O$$

To our knowledge these are the only reported reactions of nitrosyl chloride upon hydrocarbons.

In many of the chemical experiments which are here reviewed nitrosyl chloride was not used as such but a mixture of some nitrite and hydrochloric acid. Theoretically this might amount to the same thing but practically it may be quite different. For instance, we have found anhydrous acetone to give with gaseous nitrosyl chloride a compound which contains chlorine and no nitrogen, while Claisen[28] received isonitrosoacetone using amyl nitrite, hydrochloric acid, and acetone. One of the principal factors responsible for such a difference may be the length of time with which the reagents may be kept in contact, since this may be indefinite in the case of pure nitrosyl chloride. The possibility of using catalytic agents and light rays also may play a part.

We have observed a reaction with almost every organic substance available, including such diverse compounds as carbon tetrachloride, chloroform, alcohol, ether, acetaldehyde, ethyl acetate, etc. As fast as possible we propose to investigate these and hope to present the results in the near future. Incidently it might be mentioned that Tilden,[10] in 1874, considered the principal role of nitrosyl chloride to be that of an oxidizing agent, mainly because phenol was eventually converted into quinone. More recently Bewad[52] has also suggested an action as oxidizer but there is as yet no conclusive evidence of this. The formation of ammonium chloride in many reactions of nitrosyl chloride might easily indicate reduction of the latter but we now know that hydroxylamine is readily produced and, as is well known, this substance gives ammonium chloride as a decomposition product. The mechanism and products of the action upon *n*-heptane was puzzling at first because of the appearance in quantity of this ammonium chloride, but the above explanation quickly cleared the way to follow the true course of the reaction.

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August 10, 1925.

THE DETERMINATION OF ACIDITY.

BY ERNEST LITTLE.*

The subject of electrometric titrations has recently been discussed in the publications of the AMERICAN PHARMACEUTICAL ASSOCIATION by Kolthoff,[1] Popoff and McHenry,[2] Wagener and McGill,[3] Giesy,[4] Krantz[5], and others. In these articles many practical applications of the hydrogen electrode have been indicated but no comprehensive presentation of the subject as applying to acidity determinations has been made. It occurred to the writer, therefore, that it might be of value to have presented a complete discussion of "The Determination of Acidity," showing recent applications of physical chemical measurements and bringing together in one paper various phases of the subject which are presented in more detail in various scattered sources. All data presented in this article are original and all graphs or curves were developed by the writer as a result of his own experimental work.

It was not many years ago that our knowledge of acidity determinations was considered to be quite complete, due primarily to the fact that it was so very limited. An acidity determination consisted merely of adding to a measured quantity of the acid material a mysterious substance called an indicator, which was supposed to possess one color in an acid solution and quite a different color in an alkaline solution, and then running in standard alkali until the desired color change occurred. Thus the acidity was determined. It was, of course, observed that in some acid solutions the indicator functioned well and in others poorly, but these facts caused no great concern. In order to determine which indicator might be most suitable for a particular titration the scientific method used was to try in turn a great number of indicators and observe which one gave the best color change and hence seemed most desirable. The crudity of this procedure has been recognized and it is no longer used, but it is at least still of historical interest.

It was soon observed that it is possible to have a solution which is acid to one indicator and alkaline toward another. For example, a dilute solution of acetic acid which has its ionization repressed by the addition of sodium acetate may be acid toward phenolphthalein, alkaline toward methyl orange and neutral toward litmus. This information constituted a tremendous advance and showed at once that various indicators change at different degrees of acidity or concentration of hydrogen ion, represented by (H^+). The (H^+) means simply the number of hydrogen ions per liter. The degree of acidity is also sometimes represented in terms of the logarithm of the reciprocal of this value, as recommended by Sorensen,[6] and is known as the p_H value.

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The question which now arises is, how can we determine at what (H^+) a particular indicator changes? To answer this question satisfactorily we must first introduce the Nernst formula and the use of the hydrogen electrode. Here we will start at the beginning. We are all familiar with the electromotive series and have learned that it is an arrangement of the metals in the order of their decreasing chemical activity. Metals of the nature of sodium and potassium located at the top of the series form very stable compounds and pass readily from the elementary to the ionic state, while gold and platinum at the bottom of the series are found in compounds which are easily reduced and pass readily from the ionic to the elementary condition. The force tending to drive a metal into the ionic condition is spoken of as its solution tension. The electrolytic potential differences for some of the more common elements, measured in volts for a one-molar metallic ion concentration in terms of hydrogen equals zero, are as follows.

Metal.	Volts.	Metal.	Volts.	Metal.	Volts.
K	+3.20	Zn	+0.770	Ag	−0.798
Na	+2.82	Fe	+0.660	Pt	−0.863
Ca	+2.56	H	0.000	Au	−1.079

If now we place a piece of zinc in a very dilute solution of a zinc salt this electro-positive element will pass into the ionic condition thus leaving the zinc negatively charged. This negatively charged zinc will attract to it or hold in its immediate vicinity positively charged zinc ions and a difference of potential will exist between this negatively charged metal and the positive solution surrounding it. The zinc ions in solution give rise to a counter pressure, which is spoken of as the osmotic pressure, which tends to drive zinc ions back into the elementary condition. The formation of zinc ions, however, continues to predominate until the (Zn^{++}) has reached such a value that the osmotic pressure becomes equal to the solution tension. Then the speeds of the reaction in the two directions are equal to each other, dynamic equilibrium is established and no difference of potential between the metal and its solution exists.

The Nernst formula[7] is a quantitative expression of the difference of potential existing between a metal and a certain concentration of its ion. Nernst first determines the osmotic work done in changing one gram-ion weight of a metal from its solution pressure, which is represented by P, to the osmotic pressure of the solution which is represented by p. This is represented by the expression

$$\text{Isomotic Work} = \int_p^P v\,dp$$

$$\text{but } pv = RT \text{ or } v = \frac{RT}{p}$$

$$\text{therefore Osmotic Work} = RT \int_p^P \frac{dp}{p}$$

$$\text{Integrating we obtain Osmotic Work} = RT \log e \frac{P}{p}$$

This osmotic work is equal to the electrical energy gained which is represented by nFE where n is the valence change, F is the faraday and E is the potential difference existing between the metal and its solution. Hence we obtain the expression

$$nFE = RT \log e \frac{P}{p}$$

Rearranging this expression, changing to electrical units completely and to logarithms to the base ten we obtain

$$E = \frac{2}{96{,}540 \times n \times 0.4343 \times 0.2394} T \log \frac{P}{p}$$

96,540 is the value of the faraday, n the valence change, 0.4343 the log. factor and 0.2394 a factor to complete the change to electrical units. We now invert so that the algebraic sign of the above expression will be the same as the positive or negative charge on the metal and express in terms of concentrations which are proportional to the pressures.

$$E = \frac{2}{96{,}540 \times n \times 0.4343 \times 0.2394} T \log \frac{c}{C}$$

C for any element is a constant at a definite temperature and is the concentration of the ion which will give zero potential between the solution and the metal. Recognizing this fact and combining the above constants we obtain for a temperature of 25° C. the final expression

$$E = \frac{0.0591}{n} \log. \frac{c}{K}$$

The application of the above discussion to the hydrogen electrode is at once apparent. The hydrogen electrode is simply a platinum electrode with the end coated with platinum black in order to have a larger surface exposed. This platinum black is bathed with pure hydrogen gas which dissolves physically in the platinum or is adsorbed by it. We have, therefore, for all practical purposes, an electrode made of hydrogen. This electrode when immersed in any solution will set up an equilibrium with the (H^+) there existing and there will be a difference of potential existing between the electrode and the solution which is expressed by the Nernst formula, just as it is for a zinc or any other metallic electrode. For the hydrogen electrode then this formula at 25° C. becomes

$$E = \frac{0.0591}{1} \log. \frac{[H^+]}{10^{-4.72}}$$

This expression, however, represents a polar potential which is not easily measured experimentally.

It is much more convenient to use the hydrogen electrode in connection with a calomel half cell in which there is also a polar potential existing between mercury and mercurous ions. The difference of potential between these two half-cells can now be easily measured. We must first, however, determine the potential of the calomel half cell against what is known as a null electrode and thus obtain a standard of potential. One of the earlier used null electrodes is the dropping electrode as recommended by Helmholtz.[8] Objections to the use of the dropping electrode have been presented by Nernst and others, but it will serve our purpose in presenting the principle involved. Nernst suggests that the hydrogen electrode immersed in a one molar (H^+) be taken as the standard and the equation $E = 0.00019837\ T \log \frac{1}{[H^+]}$ be used. Here, however, experimental difficulties creep

in and rather than use two hydrogen electrodes, one hydrogen electrode is used in connection with a calomel cell. In order to use the above formula, we should know the potential difference between the calomel electrode and a one-molar hydrogen electrode. As it is exceedingly difficult to prepare a solution of (H^+) equal exactly to one, it is customary to determine the potential difference between the calomel electrode and some lower, known (H^+) and then from this data calculate what the potential difference between the calomel electrode and the one-molar hydrogen electrode would be. In the dropping electrode a funnel with a capillary opening extends below the surface of a normal solution of potassium chloride which also contains Hg^+ and has a layer of mercury on the bottom of the vessel. As the little globules of mercury fall from the funnel into the solution they become positively charged due to the fact that the osmotic pressure exceeds the solution tension. These positively charged mercury globules will attract anions to their surface and carry them from the solution to the mercury below. When they come in contact with the mercury layer, their capacity is diminished due to a greatly decreased surface. The result is that mercurous ions equal to the number of anions present are given back to the solution. When the osmotic and solution pressures become equal, the process stops and the mercury at the bottom will have the same potential as the solution. The difference of potential between the mercury layer and the mercury in the funnel is then measured and recorded as the potential of the molar potassium chloride calomel half cell. At 25° C. this standard of potential is found to be 0.5648 volts.

This normal potassium chloride electrode is then placed in circuit with a saturated potassium chloride calomel half cell and the difference of potential between these two electrodes is found to be 0.0382 volts at 25° C. This gives a value of 0.5648–0.0382 or 0.5266 volts for the saturated potassium chloride calomel half cell at 25° C.

This standard of potential can now be used with the hydrogen electrode to determine the p_H value of any solution. The hydrogen electrode is put in the solution being tested and is placed in circuit with the saturated potassium chloride calomel electrode. The difference of potential between these two electrodes is now measured. Let it be represented by E. Then E = 0.5266 − hydrogen electrode polar potential, or

$$E = 0.5266 - \frac{0.0591}{1} \log. \frac{[H^+]}{10^{-4.72}}$$

Rearranging we obtain

$$\log. \frac{1}{[H^+]} \text{ or } p_H \text{ value} = \frac{E - 0.2477}{0.0591}$$

This equation represents a straight line relationship between E and p_H values and can be plotted as shown in Graph No. 1. By use of this graph p_H values corresponding to observed voltages can be quickly determined.

Two methods of determining E are now in general practice. One is the millivoltmeter set up as recommended by Hildebrand[9] and the other involves the use of a potentiometer. The Hildebrand set up is shown by the following diagram.

(A) is a storage battery any fractional part of which may be utilized between points (I) and (C) by moving the sliding contact (C), thus increasing or decreasing

resistance offered by (B). (H) is a hydrogen electrode and (F) is a calomel half cell. Together these constitute a cell which is so arranged as to oppose the difference of potential from the storage battery (A). The operation of the set-up is simple and consists of moving the sliding contact (C) until there is no deflection of the galvanometer (G) when contact is made at (L). This indicates that the difference of potential (E) between the hydrogen electrode and the calomel cell is equal to the difference of potential between the points (I) and (C) and is the potential registered by the millivoltmeter (D).

The essential parts of the potentiometer set up are given below as outlined by Klopsteg.[10] The standard cell represented is a standard Weston cell. The galvanometer used is a high sensitivity galvanometer. The source of current is

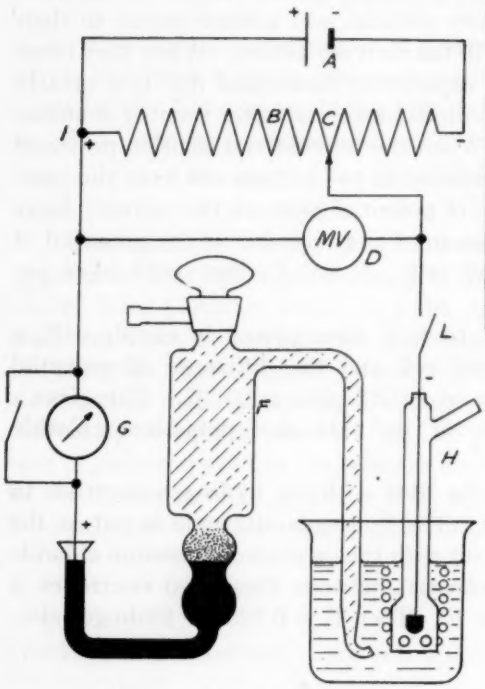
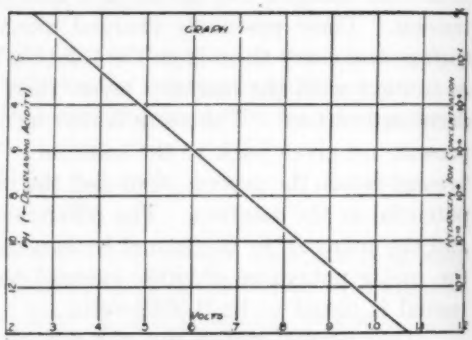


Fig. 1.



Graph No. 1.

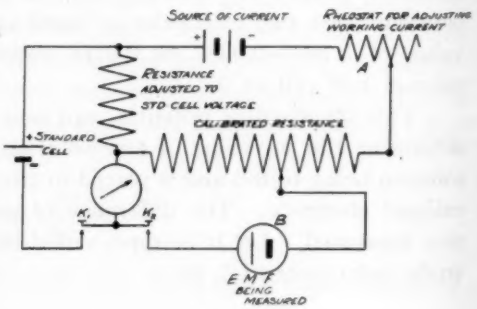


Fig. 2.

a two-volt storage battery. The E.M.F. being measured is for a cell, the cathode of which is a hydrogen electrode which is bathed with hydrogen and immersed in the solution being titrated. The anode is a saturated potassium chloride calomel electrode, which makes contact with the solution being titrated through the agency of a saturated potassium chloride salt bridge as recommended by Fales and Mudge.[11]

Contact is first made at K_1 and the resistance (A) regulated so that there is no galvanometer deflection when the circuit is momentarily closed. This step is to obtain from the storage battery the same difference of potential as that which was used when the wire was calibrated. Contact is then broken at K_1 and made at K_2. This puts the unknown E.M.F. (B) in circuit and throws the standard

cell out. The calibrated resistance is then so regulated that the galvanometer will not deflect. The difference of potential (E) can then be read on the potentiometer to hundredths of a millivolt. We are now familiar with the hydrogen electrode, the Nernst formula, and two common experimental methods of determining the (H^+) of a solution.

The use of this set-up to determine the (H^+) at which an indicator will change color is at once apparent. A solution of acid is placed in the beaker containing the hydrogen electrode, with a suitable amount of indicator added, and is titrated with a base in the ordinary way until the desired color change takes place. The potentiometer or millivoltmeter is then read and the p_H value corresponding to the difference of potential obtained is calculated. The p_H values at which various indicators change will be found listed in modern quantitative texts.[12]

The use of the above set-up for titrating acidity is also apparent. Let us assume that we wish to titrate a weak acid whose aqueous solution is very dark and cannot well be decolorized. The use of indicators is, therefore, impossible. A measured amount of the acid is placed in the beaker with the hydrogen electrode and diluted to titrating volume. Let us assume that we wish to titrate to the exact neutral point, a p_H value of seven. The potentiometer is therefore set at a value of 0.6614 volts and the titration is started in the usual way, with the galvanometer deflecting, let us say, to the right. Standard alkali is run in until one drop causes a deflection of the galvanometer in the opposite direction. Or in case of the millivoltmeter set-up alkali is run in until the reading on the millivoltmeter is 0.6614 and the galvanometer shows no deflection. This affords a very accurate method for acidity titrations to any desired p_H value as the end-point.

Another valuable use of this set-up is the determination of whether or not a particular acid solution can be analyzed quantitatively by use of indicators and if so which indicators are suitable for the titration. In order to do this we must construct titration curves for the electrometric titration. The solution is titrated in the presence of the hydrogen electrode as outlined above. The difference of potential between the hydrogen electrode and the calomel half cell is measured for each cubic centimeter of alkali added, except in the region of pronounced changes in the (H^+) where readings are more frequently taken. The cubic centimeters of alkali used are then plotted against the corresponding p_H values of the solution and the titration curve thus constructed.

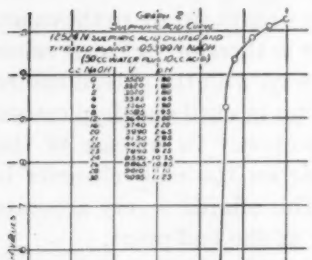
When a strong acid is titrated with standard sodium hydroxide the titration curve resulting is shown in Graph No. 2. When a volume of 22 cc. of alkali have been added we obtain an increase in p_H value from 3.5 to 9.5. This tells us that an accurate indicator titration can be run and that our choice of an indicator is not greatly restricted. Any one of the three common indicators, phenolphthalein, litmus and methyl orange could be accurately used.

When a weak acid is titrated, the curve resulting is shown in Graph No. 3. The sudden increase in the p_H value here took place when 25 cc. of sodium hydroxide had been added. The break in the curve is pronounced enough to allow of a suitable indicator end-point but it is evident that we are much more restricted in our choice of an indicator. An indicator changing at p_H values between 6.5 and 9.5 must be chosen. Either litmus or phenolphthalein ought to

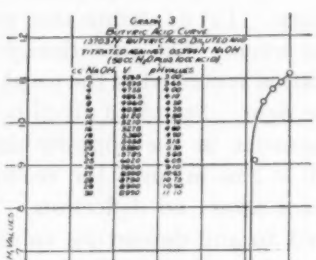
function well, the latter being preferred. The upward bulge in the curve before a p_H of 5 is reached is caused by the repression of the ionization of the acid due to the increasing concentration of its anion. No such repression was observed in the strong acid titration curve.

When sodium carbonate is titrated electrometrically with $N/10$ hydrochloric acid, the titration curve is shown in Graph No. 4.

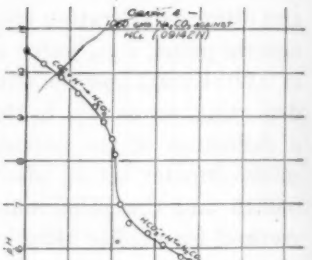
This titration curve is most illuminating. Two breaks are observed which make indicator end-points possible. The first break occurs when 11 cc. of acid have been added and registers the point where all CO_3 has been changed to HCO_3^- and carbonic acid begins to be formed. The second break occurs when just twice as much acid has been added. Then all HCO_3^- has been changed to carbonic acid and one drop of $N/10$ hydrochloric acid in excess has been added. It is also observed that phenolphthalein changing at a p_H value of about eight is a possible indicator for the first end-point and that methyl orange changing at a p_H value of about four ought to indicate the second. The first break is also less pronounced



Graph No. 2.



Graph No. 3.



Graph No. 4.

than the second and thus records the well-known fact that when carbonate mixtures are being titrated the phenolphthalein end-point is less satisfactory than the methyl orange end-point. This first end-point could be improved upon if an indicator changing color at a lower p_H value was substituted for phenolphthalein.[13]

The following curve (Graph No. 5) was constructed for a mixture of sodium hydroxide and sodium carbonate.

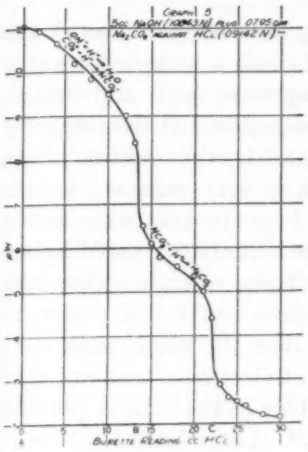
This curve is as we would expect it to be. It shows the two possible end-points. The amount of acid (AB) used upon reaching the phenolphthalein end-point is shown to be greater than the volume (BC) used from this point to the methyl orange end-point and the method of calculating such mixtures quantitatively is justified.

For a sodium carbonate and bicarbonate mixture the results are shown in Graph No. 6.

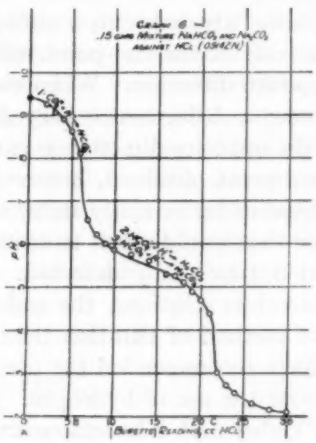
The so-called phenolphthalein volume AB is here less than the methyl orange

volume BC and our method of calculating such mixtures is also justified. The bicarbonate in equation (2) is that which has been made by half neutralizing carbonate ion. The bicarbonate represented by equation (3) is that which was originally present in the sample as such.

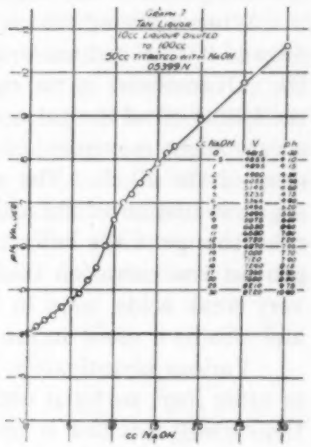
The following Graph,[14] No. 7, is one showing the relationship between cubic centimeters of $N/10$ alkali and p_H values when a mixture of very weak acids



Graph No. 5.



Graph No. 6.



Graph No. 7.

is titrated. This particular sample was a vegetable tan liquor. An examination of this curve shows that no accurate indicator end-point is possible. At no time during the titration do we get a sudden enough increase in p_H value to make possible a suitable color change of any indicator. If the acidity of this solution is to be accurately determined, a method involving some other principle must be used. This can be accomplished by an electrometric titration as above outlined. This, however, necessitates the use of fairly complicated and expensive apparatus and a knowledge of physical chemistry which is not possessed by all analysts.

The following simpler method[15] can, therefore, be used to better advantage. The apparatus employed is shown by the following diagram.

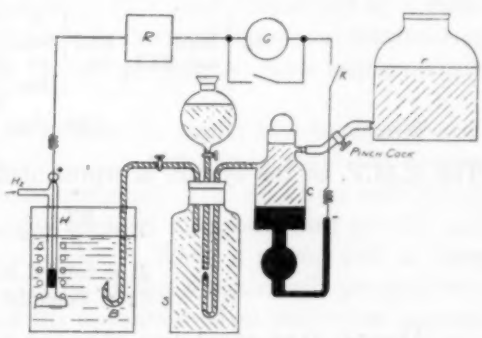


Fig. 3.

C is a cadmium half cell containing 12 per cent cadmium amalgam in contact with a solution of cadmium sulphate and potassium iodide. This cadmium half cell constitutes the negative pole of the cell and the hydrogen electrode constitutes the positive pole. When the difference of potential between these two electrodes is zero, there is no deflection of the galvanometer. K is a key to make and break the circuit. G is a galvanometer. H is a Hildebrand type of hydrogen electrode. S is a saturated potassium chloride salt bridge to reduce

contact potentials and r is a large reservoir of the electrode solution which is being used in the cadmium half cell.

The operation of the set-up is quite simple and needs little comment. The solution being titrated is placed in Beaker B with the hydrogen electrode as indicated in the diagram. Standard alkali is then run in until one drop causes a deflection of the galvanometer in the opposite direction, thus clearly indicating the end-point of the titration.

When a strong acid is being titrated with a strong base, the addition of one drop of 0.05 N sodium hydroxide at the end-point will cause a wide deflection of the galvanometer in the opposite direction. When very weak acids are titrated, the falling off of the galvanometer deflections is very gradual and at the end-point a very slight movement in the opposite direction is caused by the addition of one drop of the alkali. The end-point obtained, however, is very accurate, as the slightest motion of the galvanometer is easily detected by the eye, whereas the color change of the indicator that would result from the slightly decreased hydrogen-ion concentration could not be easily detected. Thus, when working with very weak acids, even in colorless solutions, the cadmium half cell is preferable and affords a more accurate method of titration than does the use of indicators.

Various investigators have recommended the use of electrodes made of glass or other inert material without the use of hydrogen. One of the earliest publications along this line is by Haber and Klemensiewiz.[16] Later Van der Meulen and Wilcoxson[17] showed that successful breaks in the titration curve could be obtained by the use of inert electrodes in the absence of hydrogen and that accurate results could be obtained with this simplified set-up.

Phyllis T. Kerridge[18] describes a method involving the use of glass electrodes in measuring p_H values with an accuracy of 0.02. Not more than five minutes are required for the determination, the volume of solution used is less than one-half cubic centimeter and the sample is returned unaltered at the end of the experiment.

The system used is represented as follows:

Hg	HgCl sat. KCl	KCl sat.	A Sol. of p_{H_1}	B Sol. of p_{H_2}	KCl sat.	HgCl sat. KCl	Hg

Thin glass membrane

The E.M.F. of the system is represented by the expression

$$E = \frac{RT}{F}(p_{H_1} - p_{H_2}) + Eg$$

E = total E.M.F.
Eg = Potential at glass membrane.

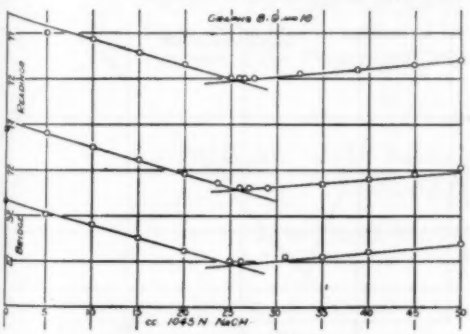
About 0.50 cc. of solution of known p_H value is placed in part of set-up marked (A) and a larger amount of a buffer solution of known p_H value is put in (B) and the E.M.F. (E standard) of the system measured. (A) is then emptied, thoroughly washed and the solution of unknown p_H value (p_{Hx}) put in. The E.M.F. (E_x) is again measured and p_{Hx} is calculated as follows:

$$p_{Hx} = p_H \text{ standard} \pm \frac{E \text{ standard} - E_x}{57.7} \text{ at } 18^\circ \text{ C.}$$

The utility of this method in biological work where frequently only small amounts of the material worked with are available, is plainly evident.

Another method of determining acidity without the use of indicators, involving quite a different principle is the conductivity method, first indicated by Kohlrausch.[19] The apparatus here employed is the ordinary Wheatstone Bridge arrangement as is shown below.

AB is the bridge, C the sliding contact and R a high-known resistance which should be so regulated that the bridge reading at the start of the titration is about fifty centimeters. This resistance is maintained constant throughout the determination. (V) constitutes the unknown resistance in a conductivity cell. (I) is a small induction coil which changes direct current from a dry cell to alternating current in order to minimize polarization effects. Since a galvanometer cannot be accurately used with alternating current, a telephone receiver, tuned to the vibration of the induction coil is substituted. When the contact (C) is at the point of balance there is no buzz in the receiver. The platinum electrodes in the conductivity cell are coated with platinum black to increase their surface,



Graphs Nos. 8, 9 and 10.

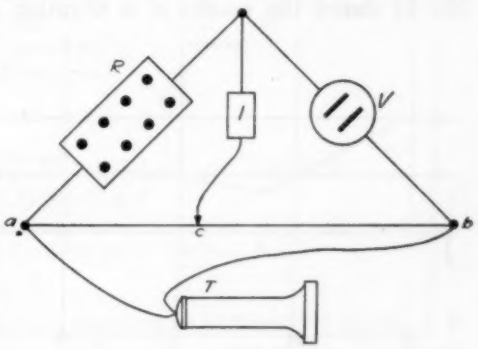


Fig. 4.

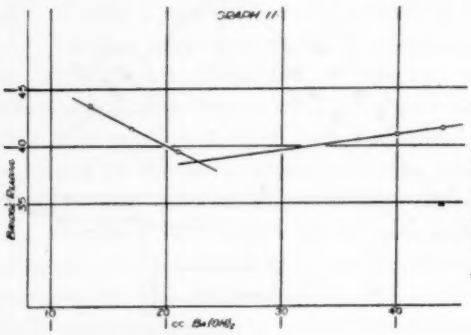
thus making a better sound minimum possible. In a more delicate set-up a Kohlrausch Bridge is substituted for a Wheatstone Bridge and the actual conductance at the different intervals in the titration plotted against the cubic centimeters of alkali used.

This method, as is well known, depends upon the ability of a solution to conduct the electric current. This conductivity being determined by the concentration and mobility of the ions which it contains. The velocities with which different ions travel toward the oppositely charged electrode vary greatly and have been determined by migration experiments. When a strong acid is being titrated with a strong base, the conductivity of the solution will progressively decrease due to the decreasing (H^+) and the formation of an equivalent amount of the less mobile sodium ion. When, however, the neutralization of the acid is complete, a further addition of alkali will cause a greatly increased concentration of the mobile hydroxyl ion and hence an increased conductivity. Thus when bridge readings are plotted as ordinates against the number of cubic centimeters of alkali added and straight lines drawn through the points on each side of the point of minimum conductivity we obtain a break in the curve which can be used as the end-point.

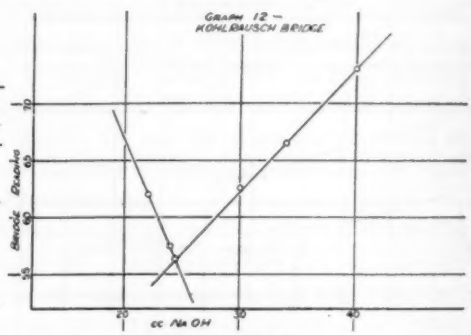
The preceding graphs were developed by Little and MacWhood during an investigation of the determination of sulphuric acid in pickle solution. The pickle solution is an aqueous solution of salt and sulphuric acid. The acid cannot always be accurately determined by use of indicators due to the fact that the pickle is frequently highly colored and due to the salt error which would be experienced by most indicators. Graphs Nos. 8, 9 and 10 show results obtained when the pickle solution was titrated with 0.1045 *N* sodium hydroxide using the ordinary Wheatstone Bridge set-up.

An examination of these graphs shows that the breaks obtained give definite points of neutralization which check each other very closely. They also agree with results obtained by use of the hydrogen electrode where 10 cc. of the pickle solution required 25.30 cc. of 0.1045 *N* NaOH.

Graph No. 11 shows results obtained when the solution was titrated with standard barium hydroxide solution. The decrease in the conductivity is greater here due to the fact that the barium ion does not replace the hydrogen ion but is precipitated as barium sulphate and thus removed from solution. Graph No. 12 shows the results of a titration using the Kohlrausch Bridge.



Graph No. 11.



Graph No. 12.

Although the graphs shown above give the desired end-point, they are rather shallow due to the conductivity of the large amount of sodium chloride present. Sulphuric acid alone titrated with sodium hydroxide would give a much sharper break in the curve.

Nothing has been stated in this discussion in regard to colorimetric methods involving the use of buffer solutions as have been prepared and studied by Clark and Lubs,[20] Walpole[21] and others. These methods are rapid, quite accurate and exceedingly useful but are dependent upon the hydrogen electrode as a primary standard.

There are also on the market many special types of apparatus designed to give (H^+) or p_H values directly.[22,23] These are very useful and will be increasingly used but involve no new principle.

For further study of this subject use should be made of Clark's work[24] and the splendid bibliography which he has made available. Prideaux[25] has also furnished valuable information on the subject.

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CHEMICAL AND BIOLOGICAL ASSAY OF DRUGS. CASCARA SAGRADA.*

BY J. B. BERARDI, PH.G., B.S., AND M. C. CANAN, B.S.

PART I.

Color tests for the identification of Cascara Sagrada as outlined by the U. S. P. are indefinite and inadequate. Other drugs such as Frangula, Aloes, Rhubarb, Senna, and Ergot give very similar color reactions by these methods so that it seems impossible to make a positive identification of any of them by this test.

More attention should be paid to the color reactions of Cascara Sagrada for it seems that the coloring matter is a fairly reliable index of the activity of the drug.

In the present work, the method for identification of Cascara, as outlined in the U. S. P. was carried out on Frangula, Aloes, Rhubarb, and Senna. It was found that color variations were so inconstant that they would not suffice for identification; therefore, we have attempted other methods which are as follows:

ETHER EXTRACTION METHOD.

Fluidextracts of Cascara, Aloes, Frangula, and Rhubarb were prepared according to the U. S. P. method. Ten cc. each of the fluidextracts were completely extracted with ether, until a color was no longer imparted to the solvent and the solvent gave no color reaction with ammonia water. During the extraction, troublesome emulsions were often encountered. The aqueous residue left after

* This paper forms part of a thesis presented in partial fulfilment of the requirements for the degree of Master of Science in Pharmacology in the Graduate School of the University of Illinois.

extraction with ether was of a dark brown color and devoid of the bitter principle, and showed no color reacting constituent and when tested therapeutically on man was found to be entirely inactive. The ether extract was then concentrated to 200 cc. and the ammonia test applied. The following color reactions were obtained:

Aloes—Orange-red
Frangula—Reddish purple
Cascara—Orange-yellow
Rhubarb—Cherry-red

The ether extracts were then evaporated to dryness and gummy residues, varying from a bright yellow to an orange-red were obtained. When tested on man these gum-like substances were found to be therapeutically active, insoluble in water, and gave color reactions with ammonia as stated above. We found, when testing for the color reactions, that the depth of color was approximately proportional to the concentration; that the colors fade rapidly on exposure to light; and that concentration of the ammonia used gave a greater depth of color, but this is probably due to a greater concentration of the solvent because, upon dilution with water, the color approached more nearly the ammonia water controls. If the powdered drugs were not extracted completely, we found that the color depth varied with the fineness of the powder and temperature at which extraction was performed; however, there seemed to be no direct relation between color depth and temperature. The powdered drug extracted with water at 100° C. and at 70° C. showed an almost imperceptible color difference, while the same drug extracted in cold water gave a lighter color reaction, but not a color that would seem to indicate a direct relation between color depth and temperature.

We could reach no definite conclusions from the above experiments, therefore, we determined to use ethyl acetate and lead subacetate as a solvent and precipitant, respectively.

ETHYL ACETATE METHOD.

Fluidextracts of Cascara, Aloes, Frangula, and Rhubarb, ten cc. in amount, were completely extracted in the same manner as in the experiments already enumerated, with exception that ethyl acetate was used as a solvent. The residue left after treatment with ethyl acetate was of a dark brown color, was not therapeutically active, did not give a color reaction with ammonia and was devoid of a bitter principle. The ethyl acetate extract was pale yellow and gave the following color reactions with ammonia water:

Aloes—Precipitate and cherry-red upper strata
Cascara—Reddish pink
Frangula—Cherry-red
Rhubarb—Deep red color in ethyl acetate strata, while ammonia strata is colored light yellow.

The ethyl acetate extracts were evaporated to dryness and a yellowish gum-like residue was obtained. This gum-like substance was found to be therapeutically active. These acetate extracts when filtered through animal charcoal gave up completely their color reacting constituents.

LEAD SUBACETATE METHOD.

Ten cc. of the fluidextracts of Cascara, Frangula, Rhubarb, and Aloes were later treated with lead subacetate. There appeared a heavy flocculent brown

precipitate. The precipitate was collected and washed with distilled water until the washings ran through clear. The precipitate was then dissolved in ethyl acetate. H_2S was then passed through the ethyl acetate solution to determine if any lead were present. No precipitate occurred. H_2S was then passed through the brown aqueous solution. A heavy black precipitate appeared. H_2S was passed through the solution until the test for lead in the filtered solution was negative, whereupon, the solution was then concentrated to 200 cc. and tested with ammonia. The color reactions were negative, therapeutically the solutions were inactive and possessed no bitter principles. Tests upon the acetate solvents gave the following color reactions with ammonia.

Cascara—Reddish pink
Aloes—Orange-red
Rhubarb—Purplish red
Frangula—Light pink

CONCLUSIONS.

1. There seems to be no definite relation between the depth of color and the temperature at which extraction is carried out. This is especially true when the drug is not completely exhausted.
2. The depth of color varies directly with fineness of powdered drug when powder is not completely extracted.
3. The color of an ammonia-treated extract fades when exposed to light.
4. The active constituent, coloring matter, and bitter principle are soluble in ether, in ethyl acetate, and are precipitated by lead subacetate.
5. The coloring constituent is more soluble in ammonia than in ether; more soluble in ether than in ethyl acetate; more soluble in ethyl acetate than in water, and there appears to be one portion almost completely insoluble in water or at least very much less soluble than in ammonia, ether or ethyl acetate.
6. Color variations in tests for Cascara, Rhubarb, Frangula, and Aloes by the present methods and methods enumerated above are inadequate for a qualitative differentiation.
7. It seems probable that lead subacetate acts merely as a physical agent in causing precipitation, and that the animal charcoal acts similarly in removing the coloring constituent.

PART II.

From the above conclusions we were led to believe that Cascara Sagrada could be split into some of its constituent parts by a difference in solubility in immiscible solvents. We hoped to isolate or separate the active constituent, the coloring matter, and the bitter principle and, if possible, a quantitative determination by a colorometric method; therefore, we undertook the following experiment:

ETHER EXTRACTION METHOD.

One hundred grams of the powdered drug identified microscopically as Cascara Sagrada (1) was placed in a 3-liter flask and ether added. After shaking for a short time the ether became yellow, the depth of color depending somewhat upon the amount of agitation and the period of time the ether is in contact with the drug. The ether was then decanted and filtered from the powdered Cascara and placed in another flask to which 200 cc. of distilled water was added. The flask

containing the ether extract and water was then arranged for distilling. Heat in the form of a water-bath was then applied and the ether was distilled over (at a temperature not above 45° C.) and collected. The ether distillate was then again used as a solvent for the cascara, thus minimizing the amount of ether necessary for the extraction. This process was continued until the powdered drug was completely extracted as was shown by a failure to color the ether while in contact with the drug and a failure of the ether to give a color reaction with ammonia. After the powdered drug had been extracted, we prepared a fluidextract from the powder by the U. S. P. method. We found the fluidextract much lighter in color than the normal extract, contained no bitter principle, gave no color reaction with ammonia and when tested therapeutically in excessively large doses showed an absence of the active cathartic principle.

When the ether extract containing its yellow coloring matter was added to the water in the distilling flask, the water remained practically colorless, thus showing ether to be the better solvent. Upon heating the flask, the yellow ether upper layer became progressively darker (probably due to concentration of the dissolved substances) and at the same time the aqueous substrata began to assume a darker yellow color, showing that at least a part of the precipitate being thrown out of solution by concentration of the ether solvent was being redissolved by the water. At the point of contact between the two immiscible solvents there appeared a black precipitate which remained floating on the surface of the water.

The ether was completely evaporated and the aqueous solution containing a soluble and insoluble substance was filtered. The insoluble substance collected on the filter paper was a deep brown or red gum-like substance, while the aqueous filtrate was of an orange yellow-color. The precipitate was then thoroughly washed with cold distilled water until the washings appeared clear, thus showing that the aqueous soluble portion had been removed. The precipitate was then thoroughly dried and in that condition took on the character somewhat of a powder, but upon addition of moisture it changed to its original state. This precipitate was a very deep dark red bordering on black; had a gum-like consistency when moist; had no odor; was devoid of bitter principle; gave a constant color reaction with ammonia, and when tested therapeutically was found to be active. A very small amount of this gum-like substance when tested with ammonia gave a deep cherry-red color, which did not assume a yellow hue when diluted.

The aqueous filtrate appeared as an orange-yellow, was extremely bitter and had an aromatic odor. This aqueous extract was then evaporated to dryness and a brown scaly residue was obtained. This residue could be powdered, was extremely bitter; was therapeutically active in small amounts and upon testing with ammonia gave a deep orange-brown color which upon dilution approached more closely a yellow, but with no indications of red.

1. From the 100 grams of powdered drug, we were able to isolate the following amounts from the various samples:

Sample.	Gum-like non-bitter principle.	Bitter principle.
I	6.35 Gm. per 100 Gm. of drug	2.89 Gm. per 100 Gm. of drug
II	7.10 Gm. per 100 Gm. of drug	3.06 Gm. per 100 Gm. of drug
III	5.94 Gm. per 100 Gm. of drug	2.63 Gm. per 100 Gm. of drug
IV	4.89 Gm. per 100 Gm. of drug	2.41 Gm. per 100 Gm. of drug

CONCLUSIONS.

1. It is necessary to amplify our first conclusions by the statement that there seems to be conclusive evidence that there are at least two color reacting constituents in Cascara Sagrada.

2. One color reacting constituent is practically insoluble in water and gives a deep cherry-red color with ammonia. The other color reacting constituent is soluble in water and gives an orange-brown color reaction with ammonia.

3. Both coloring constituents are soluble in ether.

4. It seems likely that the variation in the U. S. P. tests may in part be due to a difference in solubility of these two constituents.

5. It may be possible to derive a quantitative color test if these are the only two coloring constituents.

6. The bitter principle is soluble in water, accompanies or is the brown color reacting constituent and accompanies or is part of the therapeutically active principle, probably an anthraquinone.

7. The non-bitter principle is insoluble in water and is therapeutically active.

8. The bitter principle acts more slowly and produces marked griping, while the non-bitter principle acts more rapidly and with less griping.

Sample (1) was obtained from the Pharmacognosy Laboratory of the University of Illinois, College of Pharmacy, and was identified as Cascara microscopically by Prof. E. N. Gathercoal.

Sample(II) was obtained from the Pharmacy laboratory of the University of Illinois, College of Pharmacy.

Samples (III) and (IV) were obtained from a local drug store.

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THE STABILITY OF OFFICIAL PEPSIN PREPARATIONS.

BY H. W. VAHLTEICH.

A. E. Taylor has stated[1] that "..... in general purine bodies tend to accelerate tryptic digestion." In 1922 Traut[2] observed that liquid medicinal pepsin preparations containing very small amounts of caffeine (a purine body) seemingly maintained their peptic activity more readily than without caffeine. It became of interest to determine whether other purine bodies, readily obtainable commercially and inexpensive could be used for this purpose in quantities so small as to be practically nontoxic. Purine derivatives available include the following: caffeine,

[1] *University of California Publications of Pathology*, I, p. 251 (1903–1907).

[2] November JOUR. A. PH. A., p. 686 (1922)—E. J. Traut and H. W. Vahlteich.

caffeine citrated, theobromine, theobromine and sodium salicylate, and uric acid. Xanthine, hypoxanthine, purine, guanine, adenine, allantoin, uracil, thymine, and cytosine are excluded because they are prohibitively expensive or entirely unobtainable.

It was also intended to compare the keeping qualities of pepsin preparations made according to the official directions except that the hydrochloric acid used is omitted, first, with such preparations containing purine derivatives, and second, with the official preparations containing both acid and purine derivatives. The preparations selected were the N. F. IV Glycerite of Pepsin and Elixir of Pepsin with the varying quantities of acid and purine bodies indicated in the table.

All of the preparations were made up from the same containerful of granular pepsin and from single lots of all other ingredients so as to eliminate any possible variables due to differences in materials or enzyme. It has been our experience that different dry pepsins deteriorate at different rates, a factor which it was important to eliminate in this work. Hence to account for such a possible deterioration of the dry pepsin used, a portion of it was retained for a determination of its proteolytic power both at the time the preparations were made and again after the two years. This particular specimen of granular pepsin showed no change in activity over the two-year period, eliminating the necessity for subtracting such a loss in activity of the liquid preparations.

To avoid a possibility of loss of enzyme by adsorption (admittedly a remote one) no talc or other clarifying medium was used in filtering the elixirs. The caffeine, theobromine, and theobromine and sodium salicylate, were dissolved in each case in 2 to 5 cc. of hot distilled water, this solution being added to the unfinished product before it was brought to volume. In making up the glycerites enough granular pepsin solution in water was made up for all of them and then aliquot portions pipetted off for each individual glycerite. The object of this was to assure that absolutely identical portions of enzyme were used in each glycerite. In making up the uric acid glycerite preparations the desired quantity of uric acid powder was dissolved in 40 to 50 cc. of glycerin with the aid of heat. For the uric acid elixir preparations the uric acid was dissolved in water with the cautious dropwise addition of 0.2*N* NaOH using neutral red as indicator to assure keeping the solution slightly on the acid side of p_H 7.0 so as to avoid decomposition of the purine group.

The preparations were stored in 250-cc. glass-stoppered bottles in 150- to 250-cc. quantities. They were kept on a shelf at a warm (in summer) south wall where the temperature from October to May was about 30° C. during the day and very likely was below 10° C. at night and when the school building was not occupied. They therefor encountered a twice daily change in temperature of 20° C. or more during most of the year.

The granular pepsin used had an activity of 1:3300 by the U. S. P. IX method.[1] It was used in exactly the quantities given in the N. F. IV for the elixir and glycerite without taking its higher activity (than 1:3000) into consideration. The preparations studied, with their original activities, activities after two years, per cent deterioration, and the p_H of each are tabulated as follows:

[1] As a matter of interest determinations were on the granular pepsin and the preparations when made up by Traut's modification of the milk method and an average of 10 to 12 determinations was found to check the U. S. P. determination in every case.

Pepsin preparation.	Proteolytic activity. Nov. 1923.	Nov. 1925.	Deterioration in per cent.	p_H Nov. 1925.
Glycerite, N. F. IV	1:3300	1:3000	9	2.9
Glycerite, 1/4 HCl	1:3300	1:3100	6	2.9
Glycerite, no HCl	1:3300	1:3100	6	3.0
Glycerite, no HCl, 0.017 Gm. caffeine per 100 cc.	1:3300	1:3300	none	3.0
Glycerite, no HCl, 0.034 Gm. caffeine per 100 cc.	1:3300	1:3300	none	3.1
Glycerite, N. F. IV, 0.017 Gm. caffeine per 100 cc.	1:3300	1:3100	6	2.9
Glycerite, no HCl, 0.017 Gm. theobromine per 100 cc.	1:3300	1:3300	none	3.0
Glycerite, no HCl, 0.034 Gm. theobromine per 100 cc.	1:3300	1:3300	none	3.0
Glycerite, N. F. IV, 0.017 Gm. theobromine per 100 cc.	1:3300	1:3100	6	2.9
Glycerite, no HCl, 0.010 Gm. uric acid per 100 cc.	1:3300	1:3300	none	3.0
Glycerite, no HCl, 0.020 Gm. uric acid per 100 cc.	1:3300	1:3300	none	3.0
Glycerite, N. F. IV, 0.020 Gm. uric acid per 100 cc.	1:3300	1:3200	3	2.9
Elixir, N. F. IV	1:3300	Below 1:100	100	1.5
Elixir, 1/4 HCl	1:3300	1:1800	45	2.6
Elixir, no HCl	1:3300	1:2100	36	3.6
Elixir, no HCl, 0.017 Gm. caffeine per 100 cc.	1:3300	1:2000	40	3.6
Elixir, no HCl, 0.034 Gm. caffeine per 100 cc.	1:3300	1:2000	40	3.6
Elixir, N. F. IV, 0.017 Gm. caffeine per 100 cc.	1:3300	1:300	91	1.6
Elixir, no HCl, 0.017 Gm. theobromine per 100 cc.	1:3300	1:1800	45	3.6
Elixir, no HCl, 0.034 Gm. theobromine per 100 cc.	1:3300	1:1800	45	3.6
Elixir, N. F. IV, 0.017 Gm. theobromine per 100 cc.	1:3300	1:200	94	1.6
Elixir, no HCl, 0.010 Gm. uric acid per 100 cc.	1:3300	1:1700	49	3.5
Elixir, no HCl, 0.020 Gm. uric acid per 100 cc.	1:3300	1:1900	42	3.6
Elixir, no HCl, 0.040 Gm. theobromine and sodium salicylate per 100 cc.	1:3300	1:1800	45	3.6
Elixir, no HCl, 0.08 Gm. theobromine and sodium salicylate per 100 cc.	1:3300	1:1900	42	3.6

"1/4 HCl" means that the preparation was made up to contain 1/4 the HCl specified in the N. F. IV.

"no HCl" means that the preparation was made up to contain no added HCl whatever.

It seems reasonable to conclude from the above data that

(1) The Glycerite of Pepsin N. F. IV keeps admirably well.

(2) The Elixir of Pepsin N. F. IV lost its entire potency in two years or less (the preparations were not assayed during the two-year period).

(3) (*a*) The purine derivatives used as "preservatives" have no decided value for the purpose, and (*b*) the elimination of the HCl in the preparation of the elixirs is just as valuable a means of preserving their proteolytic activity as is the addition of the purine derivatives.

It is also interesting to observe that the p_H of the Elixirs of Pepsin, N. F. IV, which lost practically their entire activity is close to the optimum p_H for peptic

digestions. This suggests that the enzyme digests itself or its carrier and so loses its activity.

I wish to acknowledge the kindness of Mr. H. T. Graber of the Digestive Ferments Co., Detroit, Mich., for furnishing the granular pepsin used in this work.

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A SUGGESTED CHANGE IN THE OFFICIAL METHOD OF ASSAY OF CRESOL IN LIQUOR CRESOLIS COMPOSITUS.

BY EDWARD L. GRIFFIN.*

The Pharmacopœia of the United States, tenth decennial revision, provides under **Liquor Cresolis Compositus,** page 210, a method for the assay of cresol. In this method the cresol is determined as the increase in volume of the aqueous layer, which results when the kerosene and cresol mixture, obtained by distilling 50 cc. of liquor cresolis compositus with kerosene after the addition of sodium bicarbonate, is shaken with 15 per cent sodium hydroxide solution. The cresol is separated from this solution by treatment with hydrochloric acid and washed with a saturated solution of sodium chloride. Five grams of freshly ignited potassium carbonate is then added to the washed cresol, after which the mixture is shaken gently at frequent intervals during three hours and allowed to stand over night. The cresol, decanted from the potassium carbonate, must meet the U. S. P. distillation requirements for cresol. In short, the pharmacopœial requirements for this product are twofold: (1) The proportion of cresol present in 50 cc. must be such as to produce a 23- to 26-cc. volume increase in the sodium hydroxide solution in which it is dissolved. (2) The liberated cresols, when dry, must come within the definite distillation requirements; 90 per cent should distil between 195° and 205° C. as described.

This method of assay was applied to several samples of liquor cresolis compositus of known composition. In all cases the increase in volume of the sodium hydroxide solution, due to cresols, was within the prescribed limits. When the cresol was separated, washed, treated with 5 grams of freshly ignited potassium carbonate, and decanted as directed, the resulting product had become viscous, almost syrupy, and on distillation left a rather large residue. When ashed the residue showed the presence of potassium. When the distillation residue was treated with hydrochloric acid very little effervescence resulted, indicating that little or no carbonate was present. This suggested that the potassium carbonate had reacted to some extent with the cresol to form potassium cresylate. More detailed experiments were, therefore, undertaken.

Liquor cresolis compositus was made from a cresol of which 98 per cent came over between 195° and 205° C. when distilled according to Method II of the Pharmacopœia. This solution was then assayed according to the Pharmacopœia method. The dried cresol was decanted through cotton and no suspended potassium carbonate was carried with it. The residue after distillation at 205° was washed out of the flask with alcohol into a weighed platinum dish, evaporated on

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the steam-bath, cooled, and weighed. This residue was then ashed and the ash titrated with normal sulphuric acid, using methyl orange as an indicator. From the titration the percentage of potassium cresylate was calculated. The results follow.

Increase in volume of NaOH solution. Cc.	Decanted dry cresol. Cc.	Distillation of cresols. To 195° C. Water. Per cent.	Phenols. Per cent.	195° to 205° C. Per cent.	Residue at 205° C. Per cent.	Calculated potassium cresylate. Per cent.
26.0	13.0	2	5	63	28	17
25.3	13.5	2	3	65	30	..
25.8	14	3	2	68	21	12

In the first two analyses granular, analytical grade, potassium carbonate, which had been freshly ignited, was used. In the third case the potassium carbonate was made in the laboratory by the ignition of granular, C. P. potassium bicarbonate to insure the absence of hydroxide. The potassium present in the residue of the first assay amounted to more than one-fifth of that in the 5 grams of potassium carbonate used in the assay. The quantity was also large in both of the other cases. With such a large quantity of material held in the residue, the distillate between 195° and 205° C. fell far below the required 90 per cent. Ignited potassium carbonate, therefore, is not suitable as a dehydrating agent for cresol.

Other drying agents, including dehydrated sodium sulphate, silica gel, and dehydrated copper sulphate, were tested. The first two were not effective in removing the water. Dehydrated copper sulphate was the best material tested. It removed most of the water and did not react with the cresol or dissolve in it in appreciable quantities. If a somewhat granular dehydrated copper sulphate was used, more dried cresol was obtained for distillation than when potassium carbonate was used.

The experimental results obtained, using the same liquor cresolis compositus as before, and the same procedure, except that 5 grams of granular, dehydrated copper sulphate (dehydrated by ignition at a low temperature) were used in place of the potassium carbonate, were as follows.

Increase in volume of NaOH solution. Cc.	Decanted dry cresol. Cc.	Distillation of cresols. To 195° C. Water. Per cent.	Phenols. Per cent.	195° to 205° C. Per cent.	Residue at 205° C. Per cent.	Ash. Per cent.
25.4	18	0.6	0.6	92	dry*	nil
25.4	17	0.6	1	91	dry*	...

* The flask was dry at 205° C., but, of course, a little cresol condensed in it when it cooled.

These distillations indicate that material used was U. S. P. cresol. The 195° to 205° fraction, however, was somewhat below that obtained with the original cresol. This is due to the large proportionate losses in distilling 18 cc. from a 200-cc. flask.

Dehydrated copper sulphate as a drying agent in the assay of liquor cresolis compositus was tested by W. A. Gersdorff of this laboratory on two samples of known composition. The dehydrated copper sulphate used was somewhat less

Decanted dried cresols. Cc.	Distillate 195° to 205° C. Cc.	Distillate 195° to 205° C. Per cent.	Original cresol. Distillate 195° to 205° C. Per cent.
12	11*	92	98
13	12*	92	97.5

* In these samples the dry point was below 205° C.

granular than that used in the experiments just reported, and he was able to decant less cresol for distillation. He obtained the above results.

These results check those obtained by the writer and the variation from the results with the original cresol are again to be explained by proportionately high losses in such a large distillation apparatus.

Since it had been shown that the use of copper sulphate as a dehydrating agent gave distillation results which agree reasonably well with the known values for the original cresol, it seemed desirable to determine what results would be obtained when a tar acid not of the grade of U. S. P. cresol was used. Therefore, mixtures were made in which the formula for liquor cresolis compositus was followed except that the cresol was replaced by other commercial "tar acids." The procedure for assay in every case was the same as that provided by the Pharmacopœia method except that granular dehydrated copper sulphate (5 Gms.) was used in place of the ignited potassium carbonate. Some of the results follow.

Brand.	Decanted dry phenols. Cc.	Distillation of phenols to 195° C. Per cent.		195° to 205° C.	Distillation on original phenols (Method II)*. to 195° C. Per cent.	195° to 205°C.
		Water.	Phenols.			
A	18	Trace	0	14	0	11
B	17	0.5	12	76	28	71
C	17.2	0.5	28	66	43	55

* Acknowledgment is made to W. A. Gersdorff for making these distillations.

These results, although not exactly duplicates of those obtained in the distillation of the original phenols, are as close as can be expected, in view of the fact that the method is empirical and that different quantities of material are used in the same apparatus. Manifestly, distilling 18 cc. from a 200-cc. bulb will not give the same results as distilling 100 cc. from the same bulb. The results certainly give a reasonably accurate idea of the material used in the supposed liquor cresolis compositus.

SUMMARY.

The cresols recovered by assaying U. S. P. liquor cresolis compositus according to the method given in the U. S. Pharmacopœia, tenth decennial revision, do not give distillation results which come within the requirements for U. S. P. cresol. The recovered cresol contains a large amount of potassium, probably as potassium cresylate. This accounts for the erroneous results.

It was found that when 5 grams of granular, dehydrated copper sulphate was used in place of the equal weight of ignited potassium carbonate prescribed by the official method (the remainder of the procedure being the same) the results obtained by distillation of the recovered cresols were comparable with those obtained on the original cresol. The loss in the apparatus is about the same whether 18 cc. of recovered cresol or 100 cc. of original cresol is used. On a percentage basis, however, it is higher when 18 cc. of recovered cresol is used. This might be corrected either by changing the distillation procedure or by using a larger sample of recovered cresol.

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THE APOTHECARY IN PAINTINGS.

A recent article in the *Weekblad* deals with the "Apothecary in Paintings" and a print of the same issue shows a fine illustration of this type entitled "The Old Apothecary," in which the interior of Ansingh's apothecary, at that time located in Amsterdam at Prinsengracht and Utrecht streets, is shown. The picture was painted from memory by Lizzy Ansingh, a daughter of J. George Schwartze, an artist of note, who started his career in Philadelphia, as a manufacturer of chemicals.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

WHAT WE WANT TO KNOW BEFORE WE BUY A PREPARATION.

A PROMINENT PROPRIETARY MANUFACTURER EXPLAINS HERE THE YARDSTICK HIS COMPANY APPLIES TO ANY PREPARATION THEY CONSIDER BUYING.

If I were asked to say in two words the most important thing that gives value to a proprietary product, my answer would be, *Established Demand*. This presupposes an item of good quality, neatly packaged and honestly promoted. I know of no better way to illustrate this than to quote an incident which occurred years ago when Dr. X.....was the head of this business.

Dr. X..... had written and collected thousands of prescriptions; in fact, his decision to enter the manufacturing business had been the result of the success he achieved with one of these prescriptions. These prescriptions he kept in an enormous file in his office.

Like all successful proprietary manufacturers, the Doctor was constantly besieged with offers of this and that formula, usually at prices which were extremely flattering to their owners. On this particular day, I happened to be sitting with Dr. X..... in his office when in walked a tall raw-boned chap, a Kentucky mountaineer. He had come to offer the Doctor exclusive ownership and rights to his marvelous penetrating liniment formula for only $1000.

When the young man had finished his remarks Dr. X..... simply turned to his prescription file and said, "Young man, this file contains a copy of every prescription I have written in 30 years of medical practice. For 25 cents you can have your blind choice of any formula in that file, to do with as you please. That expresses about what a formula is worth until there is an established demand for it."

We know from costly experience how expensive it is to create demand for a proprietary preparation, and therefore the larger the sale it already has, the more valuable it is.

In this connection, let me say that it is just as expensive—yes, even more costly—to try to create demand for a poor product as it is for a good one, but the results are decidedly different. The good product gains the greater and the more permanent success. That is why we use every means at our command to make sure that a product for which we propose to create a demand is intrinsically worthy.

Next to and almost as important as quality is the type of product. Many classes of medicinal preparations, formerly large sellers, now are discredited not only by the medical profession, but by the laity. Among these are blood purifiers, kidney remedies, female tonics and, while these still sell, the market for these classes of products is, in our judgment, decreasing instead of increasing.

As against the above types, the market for dental preparations and toilet articles has increased tremendously, while the market for simple external and

* Instructor of Merchandising, Wharton School of Finance & Commerce, University of Pennsylvania; Lecturer on Business Administration, Philadelphia College of Pharmacy and Science.

household remedies, such as liniments, antiseptics, cough syrups, etc., is about holding its own.

There is also a class of products known as "physicians' specialties" the sale of which depends almost entirely on the merit of the product and the efforts and intelligence with which they are promoted. Quite often "physicians' specialties" have a direct "over the counter sale to consumers." Every druggist knows of such.

Intrinsic worth is basic to the permanent success of any product, but, as I have said, intrinsic worth of itself is of little or no value until demand has been created.

The more widespread this demand is, the more valuable is the product. For instance, we would feel that a product which had $1,000,000 sales in 30 states would be worth more (other things being equal) than a product which had $1,000,000 sales in one state. It is easier and less expensive to build on a foundation already laid than it is to build a new foundation. We believe, moreover, that widespread demand is demonstrated evidence of the stability of this demand.

As additional evidence of the stability of demand, the age of a product is a favorable factor. We make one preparation for which not a line of advertising has appeared since 1902, yet year after year the sales hold about the same. That product was long established when we bought it.

In this connection, I might mention that two policies are possible with a product we buy. One is to get all the immediate profit we can from it. The other is to sacrifice present profits to the development of future business. Naturally, the product on which we can expect to earn a profit from the day we take it over is more valuable than one into which we must put additional capital and effort before it can be put permanently on a paying basis.

The selling methods which have been used have an effect upon the value we place upon a business. If the product has been sold exclusively through jobbers, retail dealers are not likely to be as heavily stocked as if the product had been sold by the manufacturer direct to retailers. Sales through jobbers tend to reflect normal demand, rather than the results of high pressure sales efforts of the manufacturer upon retail druggists.

I am often asked if the physical character of the product has any important bearing on its salability. This depends upon the type of remedy. Our experience indicates that the public does not take kindly to pills or tablets for blood or female preparations. Liquids seem to be preferred, even for laxatives, although many laxative pills and tablets are taken. Tablets, on the other hand, are preferred for dyspepsia, headaches, etc. Tablets, pills and powders are more easily handled and shipped than liquid preparations. Proper investigation will usually enable one to decide the form in which the preparation should be supplied.

In the preceding paragraphs I have tried to set down the principal factors which we take into account when we are asked to buy a preparation. When the time comes for an actual determination of the price to be paid we proceed about as follows:

First, we take the present value of the tangible assets of the business. To this we add a payment for patents, good will and other intangible assets. This payment may range from $500 upward for each $1000 of annual sales that the business has enjoyed. On this capitalization of tangible and intangible assets we should expect net earnings of at least 15 per cent a year. I do not believe a toilet

goods or proprietary medicine business can be safely conducted with a smaller return. The nature of the business makes it extremely hazardous. We have always found it wise to declare never more than half of our net earnings as dividends. The other half is reserved for contingencies. Thus anticipated earnings of 15 per cent means a dividend rate of only 7 or 8 per cent on the investment.

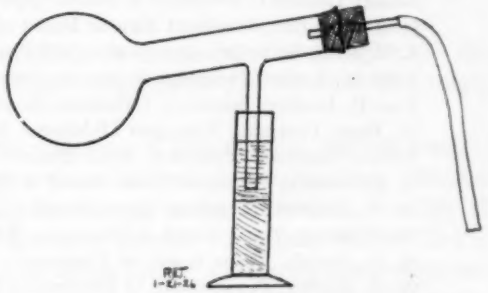
SEASONABLE DISPLAYS FOR MARCH AND APRIL.

Face Creams and Lotions.
Medicinal and Toilet Soaps.
Brushes.
Housecleaning Aids.
Insecticides and Germicides.
Veterinary Preparations.
Perfumes, Toilet Waters, and Sachets.

A SIMPLE METHOD FOR THE SEPARATION OF IMMISCIBLE LIQUIDS.

BY RALPH E. TERRY.

The separation of the top layer of an immiscible mixture results in contamination if performed with an ordinary separatory funnel, due to the adhering lower layer in the tube of the funnel. To prevent this during the course of an analysis performed a short time ago, the following method was employed. A 125-cc. distilling flask was fitted with a one-hole rubber stopper. A short piece of glass tubing was next fitted to the stopper and a two-foot length of soft rubber tubing slipped over the end. The accompanying sketch illustrates the actual manipulation.



There are a number of features of this method—some of which are:

1. There is little chance of getting a "mouthful" of the liquid as it runs down into the bulb of the flask.

2. By holding the entire apparatus at eye-level a careful watch may be kept of the operation.

3. The separation may be made rather sharply as the lower liquid may be drawn into the side tube of the flask, and then allowed to run back.

4. In case where the material is to be distilled, no transfer is necessary.

Doubtless there are other advantages which will present themselves from time to time.

DEPARTMENT OF MATERIA MEDICA,
UNIVERSITY OF SOUTHERN CALIFORNIA.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

M. N. Ford, President, Columbus, Ohio. J. W. Gayle, Treasurer, Frankfort, Ky. Edw. H. Walsdorf, Chairman of Executive Committee, New Orleans, La. H. C. Christensen, Secretary, 130 N. Wells St., Chicago, Ill.

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Indiana			

N. A. B. P. DISTRICT NO. 6 HOLDS SUCCESSFUL MEETING.

The meeting of District No. 6, N. A. B. P., held in San Antonio, Texas, on January 22, 1926, was well attended by board members of four of the five member states—Arkansas, Kansas, Oklahoma and Texas. The Missouri Board had promised to send delegates but wired that last minute circumstances made it impossible.

The following were present:

Booker Lattimer, President Arkansas Board of Pharmacy, Dewitt, Arkansas.
John Schmitter, President Kansas Board of Pharmacy, Gypsum, Kansas.
A. H. King, Secretary Kansas Board of Pharmacy, Manhattan, Kansas.
Tedd M. Tether, President Oklahoma Board of Pharmacy, Pauls Valley, Oklahoma.
Tom R. Hadley, Secretary Oklahoma Board of Pharmacy, Oklahoma City, Oklahoma.
W. Perry Freeman, Treasurer Oklahoma Board of Pharmacy, Washington, Oklahoma.
Wilford Harrison, President Texas Board of Pharmacy, Wichita Falls, Texas.
M. E. Dooley, Treasurer Texas Board of Pharmacy, Wolfe City, Texas.
W. H. Cousins, Secretary Texas Board of Pharmacy, Dallas, Texas.
A. H. Seeley, Texas Board of Pharmacy, Cleburne, Texas.
E. M. Joseph, Texas Board of Pharmacy, Austin, Texas.
W. A. Klecka, Texas Board of Pharmacy, Temple, Texas.
W. H. Whisenant, former member Texas Board of Pharmacy, San Antonio, Texas.
Dr. W. F. Gidley, Texas University, Department of Pharmacy, Galveston, Texas.
H. C. Christensen, Secretary National Association of Boards of Pharmacy, Chicago, Ill.

Mr. Wilford Harrison, President of the Texas Board of Pharmacy, N. A. B. P., Vice-President and Chairman of the District, presided. A. H. Seely of the Texas Board acted as Secretary. Mr. Harrison in his opening remarks urged that free and frank expression be used by all those in attendance in discussing the matters coming before the meeting. There proved to be no need for a second suggestion along this line as every one present entered into the discussion with such enthusiasm and snap that the meeting developed into one of the best that the writer has had the good fortune to attend.

Some of the subjects or topics discussed and on which resolutions of approval or favorable consensus of opinion were had are as follows:

(1) Every state should require, as a prerequisite for examination and registration as Pharmacist, that candidates must have completed four years of high school, or have the equivalent in standard units of education, have graduated from generally recognized schools or colleges of pharmacy and in addition must have sufficient service or experience in a pharmacy or drug store, under Registered Pharmacists, to make their pharmaceutical training total four years. Or, that graduates of a four-year pharmacy course should be given credit for three years on the required four years of pharmaceutical training, but must in addition furnish proofs of having had not less than one year of service or experience in a retail pharmacy or drug store under the supervision of a Registered Pharmacist.

The foregoing includes in substance the provisions of the prerequisite clause recommended by the N. A. B. P. and which has been incorporated into the laws of a number of states. Copies of this prerequisite clause or section may be had by applying to the office of the Secretary of the N. A. B. P.

(2) Thorough discussion was had on the needs and advantages of uniformity of state laws with reference to requirements for entrance to examination for Pharmacists and uniformity of examination methods, as factors in facilitating reciprocity.

It was recommended that states when making changes in their pharmacy laws, or planning new laws, follow closely the "N. A. B. P. model" prerequisite and reciprocity clauses or sections covering these points.

The N. A. B. P. standard examination as outlined by Mr. Christensen also was endorsed and recommended for adoption by all states as a minimum standard examination.

(3) A motion was adopted recommending that more attention be given to the subjects of Bacteriology and Pharmaceutical Jurisprudence, in Board of Pharmacy examinations.

In the discussion which preceded the adoption of this motion, various suggestions were made relative to the handling of these subjects in examination, whether they were to be given in separate examination papers or include a number of questions or parts of questions in some of the other papers. It finally was left to the individual boards to decide as they might think best. One suggestion that received considerable approval was that pharmaceutical jurisprudence and pharmaceutical mathematics might well be included in the same paper to consist of five questions on each of these subjects. Another suggestion that received some favorable attention was that a number of questions on the subject of bacteriology be worked into the Materia Medica paper, until such time as the educational requirements of a state would seem to justify a separate question paper on this subject.

(4) It was moved, duly seconded and carried that state boards of pharmacy base their examination questions, beginning with the May and June examinations of this year, 1926, on the U. S. P. X, but that proper leniency be shown, for some months to come, to those candidates who have had their training under the U. S. P. IX.

(5) The discussion at this point turned to the apparent need of a closer relationship between members of State Boards of Pharmacy and members of the faculties of colleges of pharmacy. It was stated that in a few states an altogether too large percentage of graduates in pharmacy fail in Board of Pharmacy examina-

tions. It was argued that in justice to candidates in examination and as a proper protection to the public, where such a condition exists, the boards and college faculties should get together and find out where the fault lies.

The discussion indicated, those present felt, that when a student body devoted time and proper effort to attendance and study at a generally recognized school or college of pharmacy, it is reasonable to expect that those students who graduate should, with few exceptions, be able to pass a State Board examination. If more than ten per cent or, at the most, 15 or 20 per cent, of graduates fail in Board examinations in any state, then it is reasonable to assume that there is something wrong either with the college course or with the State Board examination. Then it is high time for members of the college faculty or faculties and members of the Board of Pharmacy of such a state to get together and take steps to remedy such a deplorable condition.

Attention also was called to the fact that both the National Association of Boards of Pharmacy and the American Association of Colleges of Pharmacy have Committees on Relations of Boards with Colleges or Colleges with Boards and that one of the duties of these joint committees might well be construed to include an adjustment of such a condition.

In this connection a motion was finally made and carried, recommending that members of State Boards of Pharmacy and members of faculties of colleges of pharmacy of individual states should arrange to meet together at regular intervals, or at least once a year, to take up any matters of mutual interest and seek to find and iron out any inconsistencies that may be found to exist either on the part of the boards or of the colleges.

(6) A motion prevailed giving approval to the effort of the N. A. B. P. to work out a plan for the issuance of a National Certificate and recommending that this plan be carried on to completion.

(7) Discussion how to best guard against applicants for reciprocity making inaccurate statements regarding their qualifications, schooling, experience, etc., when applying for reciprocal registration, brought out the fact that similar problems have to be met in regard to candidates applying for registration by examination. Carelessness on the part of applicants was ascribed as, most frequently, being the cause of this, but it was agreed that now and then there was fraudulent intent.

The consensus of opinion of those present was that great care should be exercised by all boards to require authentic and proper information and documentary evidence to be filed with the board by candidates for examination. It was agreed that candidates when submitting proofs of preliminary education, college of pharmacy training, service or experience in a pharmacy or drug store, etc., should always be required to make a sworn statement of these qualifications in their application for entrance to examination. And that they should, in addition, be required to file affidavits or other documentary evidence of verification from school, college, employer, etc. It was pointed out that if this plan was followed by all states, suspected or doubted information or statements made by applicants for reciprocal registration could be easily verified and danger of fraud thereby reduced to a minimum.

It was also stated that Board examination records have from time to time

been destroyed by fire, lost, misplaced, etc., and that similar circumstances occasionally may be expected to arise in the future. Here a recommendation made by Mr. Hunter of Florida last year at the meeting of District No. 7 was gone into in detail. His plan was to have duplicate examination records of all member states preserved in the office of the Secretary of the N. A. B. P. for safe keeping. Then if the originals are destroyed, lost, misplaced, etc., duplicates would be available. Mr. Hunter's recommendation carried with it the suggestion that when candidates file application to take examination they should be required to submit duplicate affidavits, proofs of experience and of college training, photographs, etc., and that these duplicates as well as copies of the Board's examination grade sheets should be forwarded, after each examination meeting, to the Office of the Secretary of the N. A. B. P. Every one present agreed that if such a plan was carried out, it would prove to be of great value. After thorough discussion, a recommendation was made and concurred in by all present that the "Hunter Plan" of preserving duplicate board records be taken up in detail at the next annual convention of the N. A. B. P. As a preliminary measure, delegates present at the meeting agreed to have the Secretary of each of their boards send to the Secretary of the N. A. B. P. after each examination a duplicate or carbon copy of its official grade sheet showing examination grades made by each candidate, both those who passed and those who failed, and indicate by check mark or otherwise, those making a grade entitling them to certificate of registration.

(8) On request of one of the board members present a discussion was entered into as to the merits and demerits of the general ruling requiring a pharmacist to practice at least one year after becoming registered in a state by examination (preferably in that state, but in any event, in some state other than the one to which he wishes to apply for reciprocal registration) before applying for reciprocity. It was explained that the purpose of this ruling was to check the tendency of candidates who sometimes go to some state other than their own for examination and then within a short time apply for registration by reciprocity back to their home state. It was made plain that where there was no evasion there could be no legitimate purpose served by applying this ruling. It was further pointed out that if such a ruling was applied generally, it might often work a great hardship on worthy applicants for reciprocity and that therefore circumstances, motives, etc., should be taken into consideration in deciding the application or non-application of this ruling. Whether a pharmacist recently registered by examination in a state, has practiced there six months, or eight months, or even a year or more, does not materially affect his competency or fitness to practice pharmacy. Therefore, if there is no evasion and the applicant is otherwise deemed worthy and fit, it was held and agreed by all present that such an applicant should not be barred from reciprocal registration in any state because of lack of practice of a full year since registration by examination. And on the other hand if evasion was apparent, as when a candidate failing in examination in his home state goes within a short time to another state and passes examination in that state, the fact that he practices a year in that state, or in some other state, should not entitle him to reciprocity back to his former home state. Evasion, it was stated, was becoming a common practice and should be blocked.

(9) Attention was called to a resolution passed by the N. A. B. P. in 1915

and, later, incorporated into the Association's By-Laws governing reciprocity. The By-Law referred to is clause "(i)" of Article two of the N. A. B. P. By-Laws printed on page 203 of the 1924 Annual Proceedings and reads as follows:

> "Provided, however, that no condition in these by-laws shall prevent a State Board of Pharmacy from granting reciprocal registration to applicants, who on account of omission, lack, loss or destruction of records, or for other reasons, cannot fully comply with these general requirements, or furnish detailed evidence or certification of grades made in examination."

The purpose of the foregoing clause was said to be self-evident. It affords opportunity to any State Board of Pharmacy to waive certain minor points of the general requirements for reciprocity and certain technicalities, in so far as that may be possible under a state law; especially in the granting of reciprocal registration to those older pharmacists of any state registered prior to 1910 and where, as is the case in a number of states, Board Examination records have been lost or destroyed by fire, or when, for other reasons, such applicants are unable to comply strictly with present-day rulings. A liberal attitude or policy especially toward the older registrants when applying for reciprocity was heartily endorsed by all present. The fact that a pharmacist has practiced fifteen years or more since registration, it was held, should be taken into consideration in passing on the application of such an applicant for reciprocal registration. In other words, it was the opinion of those present that more attention should be given to trying to find a way around technical points standing in the way of reciprocal registration of otherwise worthy and fit applicants, instead of, as is sometimes done, making use of every possible technicality to prevent such registration.

Many other points of interest to State Boards of Pharmacy were discussed, among them being the following:

Duties and privileges of Board interpretation of state laws.

Board power of construction of mooted questions or points of state law affecting registration and the practice of Pharmacy.

Board power to formulate and adopt rulings under state pharmacy laws similar to methods of Federal authorities who regulate the practice of Pharmacy under certain Federal or National laws.

Legislation proposed or desired by the various states.

N. A. B. P. Advisory Examination Committee aid to new state board members and others in the science of preparing examination question papers.

Practical examination—actual compounding—highly important in Board examinations.

Grading answers of candidates in examination, etc.

The visiting board members spent the day previous to that on which the district meeting was held, with the Texas Board, looking over examination questions and methods. The practical work, actual compounding of prescriptions and preparations, was of special interest. The examination as a whole received favorable comment and approval of all present and was pronounced strictly up to a graduate in pharmacy standard, although Texas does not require graduation for entrance to examination for registration as Pharmacist.

A very enjoyable feature of the stay of the visiting members in San Antonio was the invitation and attendance of all at the annual banquet of the San Antonio

Retail Druggists' Association held at the St. Anthony Hotel. There was an attendance of four hundred people. After an excellent dinner, interesting talks were made by the speakers of the evening. This was followed by a Charleston contest and dancing.

DISTRICT NO. 7 MEETING CALLED OFF.

The meeting of District No. 7 announced in our January Issue to be held in Jackson, Miss., on January 25 and 27, was called off by Vice-President John E. Guess, Chairman of the District. Mr. Guess will announce a new date for the meeting in the near future.

GENERAL NEWS ITEMS.

Your Editor in his capacity as Secretary of the N. A. B. P. made stops at Lincoln and Denver, en route to San Antonio. A meeting of the Colorado Board in progress on arrival at Denver gave the writer an opportunity to review the work of the Board. As usual, Charles Clayton was on the job and his two colleagues, Messrs. Howard and Murray, were working over time to keep pace with him.

The Colorado Board is somewhat handicapped by having only three board members. There were fifty-one candidates for examination and with the thoroughness given to examination work by this Board, three members are not enough. The Colorado pharmacy law does not require college of pharmacy graduation but, as with several other states where pharmacists have been unable to obtain prerequisite legislation, the Colorado Board examination is well up to a graduate standard.

A delegation of quiz school "graduates" from a neighboring state attended in a body to take the examination. It's too bad, boys, but "you all," or very nearly all of you, will know better next time.

Dr. A. G. DuMez, well-known pharmacist and educator, has been appointed by President Woods to succeed Dr. E. F. Kelly, resigned, as Dean of the School of Pharmacy of the University of Maryland. The Boards of Pharmacy extend a hearty welcome to him on his return to the work field of pharmaceutical education. We need his type of man in college work.

Dr. E. F. Kelly, was elected full-time Secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION and took up his new duties in the Baltimore office of the A. PH. A. on January 1, 1926. We are sorry to lose Dr. Kelly but inasmuch as all Board men are interested in the A. PH. A. as well as in colleges, we feel that we still have him with us in our work for Pharmacy.

Samuel L. Antonow, Chicago's pharmacist-lawyer, is now receiving congratulations on his recent appointment by Governor Len Small of Illinois, to the position of Assistant Director of the State Department of Registration and Education.

Under this department is grouped the greater part of the administrative machinery relating to the issuing of licenses and the regulation of the practice of architecture, barbering, beauty parlors, chiropody, dentistry, embalming, horseshoeing, medicine and surgery (in all their branches as well as the treatment of human ailments without the use of drugs or operative surgery and midwifery), nursing, *pharmacy*, plumbing, real estate, structural engineering and veterinary medicine and surgery.

Mr. Antonow in his position as Assistant Director will have charge of investigations and prosecutions of persons or firms charged with violations of the state laws governing the various professions, trades and occupations coming under the Department.

Mr. Antonow's long and varied service in the pharmaceutical field, both in actual practice and in association activities, together with his experience gained through practice in law, peculiarly fits him for the position he now holds.

ISSUANCE OF NATIONAL FORMULARY V DELAYED.

The AMERICAN PHARMACEUTICAL ASSOCIATION announces that the NATIONAL FORMULARY V cannot become official before July 1, 1926. The new edition (N. F. V) will therefore not be available for the present school semester nor for spring

examinations by Boards of Pharmacy. This announcement is made so that Pharmacy Schools, State Boards of Pharmacy and students or prospective candidates for State Board examination can govern themselves accordingly.

There are ample stocks of the NATIONAL FORMULARY IV on hand and the Midland Publishing Company, distributor, is prepared to supply copies of this edition promptly. If desired, copies will be furnished by the Secretary of the N. A. B. P., 139 North Wells Street, Chicago, Illinois.

STATE BOARDS OF PHARMACY NEWS ITEMS.

Alabama.—The Board held a meeting on February 9 and 10, 1926. Sixty-six candidates appeared for examination. This number was somewhat larger than the average for this Board, probably due to the fact that all who can and are eligible, are presenting themselves for examination and registration before the college of pharmacy graduate requirement becomes effective January 1, 1927. The Board voted to hold an examination December 28 and 29 of this year to take care of applicants who are not graduates in pharmacy and who become twenty-one (21) years of age after the examination to be held in October.

California.—The California State Board of Pharmacy recently held an examination at which seventy-eight candidates were successful for Licentiate in Pharmacy and eighty for Assistant Registration.

The Board as well as state and local association interests are again taking steps towards preparing and submitting to the next Legislature of the state, amendments to the present pharmacy law or possibly a whole new law. It is hoped it will include prerequisite and other features in harmony with standards now in force and effective in a large majority of the states.

It will be remembered that pharmacy interests secured the passage before both houses of the State Legislature somewhat over a year ago, of a bill including a college of pharmacy prerequisite and other changes, but that it was vetoed by Governor F. W. Richardson.

Colorado.—The Colorado Board held its mid-winter examination in Denver, January 15 and 16. Forty-one candidates appeared for examination for Registered Pharmacist certificates and ten for Assistant licenses. This class of fifty-one candidates was the largest in the history of the Board for this time of the year and one of the largest in the entire history of the Colorado Board.

The annual report of the Board for 1925, now in the hands of the printer, will show that within the period of twelve months which it covers, thirty-one new Pharmacists were registered as a result of examinations, while forty were granted registration by reciprocity. During the same period, sixteen were dropped for non-payment of renewal fees and the unusually large number of nineteen answered to the call of death, leaving a net gain of thirty-six and making a total of 1330 Registered Pharmacists in good standing; of these, a little over four hundred do not live in Colorado but keep up their registration.

The next Board examination will be held about the middle of May; exact date will be given later.

District of Columbia.—At the quarterly meeting of the Board of Pharmacy of the District of Columbia, forty-two candidates presented themselves for examination for registration as Pharmacists of which number seven were successful.

Maurice Jacquelyn Baptist was granted reciprocal registration on his Virginia state license.

Georgia.—Jesse A. Mitchell of Macon has been appointed by Governor C. N. Walker to succeed E. L. Murray, former member and Secretary of the Board, whose term expired. Claude Roundtree of Thomasville was elected Secretary.

The next examination meeting will be held April 26, 1926.

Indiana.—The State Board of Pharmacy of Indiana held an examination January 11 to 13 inclusive at which twenty-eight candidates passed for full Registered Pharmacists and sixteen for Assistant Registration.

Iowa.—The Attorney General of the State of Iowa rendered an opinion to the Board on February 19, 1926 that Acetylsalicylic Acid (Aspirin) cannot be sold in the state of Iowa except by stores owned and conducted by or in charge of Licensed or Registered Pharmacists, or where Li-

censed or Registered Pharmacists are employed. The Board expects to enforce this ruling within a short time and to stop the promiscous sale of this preparation by barber shops, news stands, cigar stores, soft drink parlors, etc.

(This ruling is more than of passing interest and Secretary H. E. Eaton, of the Iowa Board, has promised more details for April issue.—H. C. C., Editor.)

Kansas.—Secretary A. H. King, of the Kansas State Board of Pharmacy, Manhattan, reports that the Kansas Board recently completed a thorough inspection and canvas of that state, including the taking up of licenses granted to dealers, general stores, etc., issued by the Secretary of the state under a former zoning law and permitting the sale by such licensed dealers of the usual domestic remedies in rural communities at least four miles from a drug store or pharmacy. This investigation started in June 1925. It was found that drugs of various kinds were being sold in bulk, also medicinal poisons in all quantities, as well as in original packages, which is illegal under the present law. The Board feels well repaid for its effort in that direction, as a real hazard to the public has been removed.

At the Board meeting held in Wichita February 3 and 4, thirty-two candidates took the examination, of which number six were granted registration as Pharmacists and four as Assistant Pharmacists.

The Board decided, at the February meeting, to discontinue the examination subject of identification of drugs and preparation as a requirement for registration. An oral quiz relating to prescriptions, etc., will be given in connection with the practical work. Practical work will be given to applicants for registration as Assistant Pharmacist in the same manner as required for full Registered Pharmacist, beginning with the May examination.

Kentucky.—Twenty-six applicants took examination for Registered Pharmacist before the Kentucky Board of Pharmacy on January 26–27 and six for Assistant Registration. Four passed for Registered Pharmacist and three for Assistant Registration.

The following qualified for registration by reciprocity:

Edwin R. Baker from North Carolina.

John E. Hanna from Florida.

Clifford Vance from Ohio.

Claud M. Hamlet from West Virginia.

The next meeting of the Board will be held in Covington April 13 and 14. The July meeting will be held in Louisville and the October meeting in Middlesboro.

Albert E. Eli, of Glasgow, appointed recently by Governor W. J. Fields to fill the vacancy caused by the death of Orville Patterson, qualified at the January meeting as a member of the Board. Mr. Eli is a graduate of the Louisville College of Pharmacy and represents the best of the younger element of progressive pharmacists; he has been assigned the subject of "Practical Work"—actual compounding of prescriptions and preparations.

(Practice work—actual compounding—is one of the obligatory subjects or branches to be included in a standard board examination.—H. C. C., Editor.)

At the January meeting of the Board a Resolution on the death of Mr. Patterson was adopted as follows:

> "George Orville Patterson was born at Lewisport, Kentucky, October 8, 1870; educated in the public schools of Hancock County; apprenticed in Pharmacy with the late Dr. O. C. Dilly, Louisville; graduated from the Louisville College of Pharmacy in 1892. Married Miss Susie Smith of Lewisport in 1892, and, in 1897, engaged in the retail drug business on his own account in Hawesville, Kentucky, in which business he continued with unusual success until his death on November 6, 1925.
>
> "He was President of the Kentucky Pharmaceutical Association for the year 1907 and 1908 and at the time of his death he was serving his third term by appointment as a member of the Kentucky Board of Pharmacy. He was a member of the town council of Hawesville, a member of the Methodist Church and of the Masonic Order of Hawesville, also of the Kosair Temple (Shrine) at Louisville. He is survived by his widow and his son Frank who succeeds him in business.
>
> "These are the bare and outstanding facts of his life and may be read of all men. But the genuineness of his personal friendships, his faithfulness to every

trust reposed in him, his generous tolerance of and respect for the opinions of others, his instant readiness to render a service, the warmth and loyalty of his personal attachments, the ineffable kindliness of his spirit—these will live forever in the hearts and lives of all those who knew and loved him.

"'NOW THEREFORE BE IT RESOLVED by the Kentucky Board of Pharmacy, in regular session assembled, that these facts of his life and this tribute to his memory be made a part of the minutes of the Board and that a copy be engrossed and sent to his family."

Minnesota.—Miss Marie Piesinger, for six years a member of the Minnesota State Board of Pharmacy and President during 1923 has been reappointed by Governor Theodore Christianson for another five-year term.

(Miss Piesinger has the distinction of being one of the only two women in the United States who has served as President of a board of pharmacy. Miss Kittie Harbord of Salem, Oregon, was the first woman to serve in this capacity. She was President of the Oregon Board of Pharmacy in 1908 and again in 1911. In 1912 she served as Secretary of the Board.—H. C. C., Editor.)

New Mexico.—The next examination of the New Mexico State Board of Pharmacy will be held Monday and Tuesday, May 24 and 25, at Santa Fe, New Mexico.

North Carolina.—James A. Henderson of Charlotte, N. C., who was elected a member of the North Carolina Board of Pharmacy June 1924, for a term of 5 years and commissioned by the Governor of the state, April 28, 1924, died at Charlotte, N. C., February 12, 1926. His association with the Board was brief but harmonious and pleasant and they deeply regret his passing. He is survived by his wife and one daughter.

The State Board of Pharmacy will meet at an early date and elect a successor to fill Mr. Henderson's unexpired term.

Ohio.—The Ohio State Board of Pharmacy conducted examinations for Pharmacists and Assistants on January 12 and 13. There were sixty applicants for the Pharmacist examination of which number forty were granted state certificates of registration. There were nineteen applicants for Assistant examination of which number twelve were successful and were granted state certificates as Assistant Pharmacists.

The highest grade made in the full Registered Pharmacist examination was 92.1% by Ralph Berg of Cleveland.

The highest grade made in Assistant examination was 86.8% by Philip Weinberg of Cleveland.

Reciprocal registration was granted to:

Cloyce A. Bowers from Indiana.
Edgar M. McGath from West Virginia.
Benjamin E. Camp from Pennsylvania.

The next examination will be held in Columbus on April 6 and 7, 1926.

Wisconsin.—Governor Blaine has appointed Edwin Boberg of Eau Clair, a member of the State Board of Pharmacy, to succeed his father, the late Otto J. S. Boberg, who served as a member of the Board for twenty years.

The Board held examination January 19–22 inclusive. The total number of candidates taking examination was ninety out of which number twenty-two passed for Registered Pharmacists and thirty-four for Assistant Pharmacists.

The next examination meeting of the Board will be held in Madison, April 20 to 23 inclusive.

Oklahoma.—Clarence M. Anderson, of Hugo, has been appointed by Governor M. E. Trapp to succeed Tom R. Hadley, resigned, as Secretary of the State Board of Pharmacy. Mr. Anderson is well and favorably known in pharmaceutical and civic circles of the state. For nineteen years he conducted a successful drug business in Hugo, which he recently sold. He has been active in the state Pharmaceutical Association; was the first Vice-President of the Association and has seen service on the Executive Board and on the Legislation Committee.

Mr. Anderson was the first President of the Rotary Club of Hugo, is prominent in Masonic work and is a member of the Methodist Church.

Mr. Hadley resigned several months ago but continued in office pending the appointment of his successor by Governor Trapp.

The next Board examination will be held June 1 and June 2.

Vermont.—The annual meeting of the Board of Pharmacy was held at the State House, Montpelier, February 3, with President Fred W. Churchill presiding. Messrs. Alexander, Russell and Root were present. Secretary Fred D. Pierce is spending the winter at Oneco, Florida.

Seventeen candidates appeared for examination out of which number five were successful in passing the examination and were granted "Skilled Pharmacists' Certificates."

Governor F. K. Billings visited the Board and offered to assist in securing larger quarters for the practical examination.

President Churchill and Secretary Pierce were reëlected for the current year (1926) and Mr. Harris W. Alexander was elected Treasurer.

The next examination will be held June 1, 1926.

THE FUTURE OF AMERICAN PHARMACEUTICAL RESEARCH.*

BY H. V. ARNY.

In suggesting topics upon which I might address you the final decision of our good friend Dean Wulling was that as chairman of the National Conference on Pharmaceutical Research I might fittingly discuss with you the subject of Research.

But some of you may say "why should we retail pharmacists be interested in research?" This question I answered in a paper entitled "Research and the Cash Register" presented at the 1921 meeting of the New Jersey Pharmaceutical Association, my contention being that every research achievement in a given calling redounded to the credit of every member of that calling; citing as proofs of my thesis, the fact that the high esteem now enjoyed by American medicine and American chemistry was due primarily to the research work of a small group of investigators in each calling.

I hold in my hand two reprints, one of a paper published by me in 1920; the other a report from the Research Conference published last year. The first of these reprints might be called "Research of the Past," since it demonstrates that pharmaceutical research has been a virile and profitable pursuit for almost 200 years and if any of my hearers doubt this assertion let me enumerate the achievements of a few of the pharmaceutical worthies listed in the paper.

Scheele, the Swedish apothecary, discoverer of chlorine, of the fruit acids and of numerous other chemicals.

Sertürner, the German apothecary, discoverer of morphine.

Pelletiere and Caventou, French pharmacists, discoverers of quinine.

Tschirch, the Swiss pharmacist, distinguished living pharmacognosist and phytochemist.

Procter, Diehl, Squibb, Rice and Remington, American pharmacists, distinguished in research and in pharmacopœial revision.

The second pamphlet, which might be called "Research of the Present," demonstrates the fact that pharmaceutical research was not only a fruitful field

* Address delivered at the annual meeting of the Minnesota Pharmaceutical Association held in Minneapolis, February 10, 1926.

of endeavor in the past but is also an attractive opportunity for service for the present day. It proves, moreover, that workers are at hand to carry on the splendid traditions of Pharmacy of the past. It also shows that the field of pharmaceutical research is sufficiently promising to attract non-pharmaceutical research workers. Of the results of this *Census of Pharmaceutical Research* I need only at this time to present the following summary of research workers of 1925:

Hospital pharmacists	3
Retail pharmacists	10
Pharmacists in medical and chemical schools	16
Non-pharmaceutical teachers, working on synthesis of medicinal chemicals	28
Governmental scientists doing pharmaceutical research	19
Manufacturing pharmacists	72
Pharmaceutical teachers and their students	91
TOTAL	239

Since these two pamphlets represent Research of the Past and of the Present respectively, I have chosen as my theme of to-day "Pharmaceutical Research of the Future," placing in evidence of my faith in the future of pharmaceutical research, a tabulated list of research topics gathered in during the Research Census of 1925 from workers in all lines of research that I have just mentioned.

I will not bore you by a reading of the 77 topics, since the list will soon be published in printed form. On the other hand, it will be illuminating to read the following headings under which these 77 topics fall.

Dispensing Pharmacy	2
Manufacture of U. S. P. and N. F. Pharmaceuticals	15
Tests for and Assays of U. S. P. and N. F. Pharmaceuticals	6
Manufacture of Medicinal Chemicals	8
Tests for and Assays of Medicinal Chemicals	8
Sources and Identification of Botanic Drugs	4
Tests for and Assays of Botanic Drugs	10
Chemistry of Drug Plants	5
Bacteriology and Biologicals	2
Enzymes and Endocrines	3
Statistical Pharmacy and Business Research	4
Miscellaneous (Historical, bibliographical, pharmacological, microscopical and physical)	10
TOTAL	77

Some of the 77 items contain subdivisions which could easily stretch the topics to over 100. Of these items, some are capable of years of study before the solution of the problem is attained. Others on the list (which is given *in toto*, without censorship) are topics which have already been worked out satisfactorily; the only task remaining being the practical application of facts already ascertained. Under "Miscellaneous" are collected topics of pharmaceutical interest and value which, however, should be worked out by the pharmacologist, the physicist or other non-pharmaceutical scientist.

This brings us to the overlapping of one science upon the other; something occurring in all types of research. Thus physiological assays are clearly a function of pharmaceutical research, since many of our most valuable drugs can be assayed

only by biological methods. On the other hand, pharmacology as applied to the therapeutic effect of drugs belongs to the highly trained medical scientist rather than to the pharmaceutical research worker. In fact, the most necessary alliance in pharmaceutical research of the future will be between the pharmaceutical botanist, the pharmaceutical chemist and the pharmacologist.

I hope I have proven the thesis that there are vast possibilities confronting the pharmaceutical research worker of to-day and that therefore the future of American pharmaceutical research is filled with promise.

This brings us to the critical phase of pharmaceutical research; the proper support of this field of endeavor. We have just suggested 77 topics calling for research and the list could be easily multiplied by three or four. On a preceding page I have classified the 239 workers reported in the Research Census of 1925 as interested in pharmaceutical research. Of these 72 are in manufacturing, 91 are teaching and 10 are in retail pharmacy. What encouragement is being given these workers?

While some manufacturing concerns are deeply interested in research, many fail to give their research departments adequate budgets despite the fact that the quickest dividends from research come from experimentation along manufacturing lines. As to research in colleges of pharmacy, the quantity of research performed is largely a question of graduate students. The average American professor is so hampered with work—teaching, administrative or organization activities—that his opportunity for personal research is very limited, no matter how keen his desire to do such work. In my own experience of the past fifteen years, the only papers I have been able to publish were those showing work done by capable helpers under my direct supervision and checking. Such helpers are usually advanced students, for in the teaching staff of the average college the younger instructors are as a rule overburdened with classroom or laboratory instruction or with the marking of test papers. On the other hand in post graduate courses leading either to the master or the doctor degree, a dissertation, embodying results of months of research, is essential and it is to these graduate students and to their teachers American Pharmacy of the future will have to turn for the best of our research work.

This being so, it behooves all of us pharmacists, retailers, wholesalers, manufacturers or teachers, to do our utmost to build up this class of research workers.

And now let us turn for a few moments to the retail pharmacist as a research worker. At first thought some of you may retort that there is no such person. After emphatically denying the latter assertion I will reluctantly express the opinion that there is a smaller proportion of retail pharmacists performing research to-day than there was fifty years ago. Anyone who doubts this assertion may compare for himself the papers published by retail pharmacists in the A. PH. A. PROCEEDINGS of the early seventies with the output from the same source in the A. PH. A. JOURNAL of last year. There are several causes for this decline in research work emanating from retail pharmacies.

In the first place retail business has become so complex a matter in the last twenty-five years that now-a-days the chief occupation of the retail pharmacist is "working for the landlord" or racing with "overhead." The spacious olden days of retail pharmacy, the days as I knew them in my own retail drug-store experiences are past and there is indeed but little time for research.

Then the retailer year by year becomes more and more a purveyor of other men's products. The old-time drug store back-room; the real laboratory where a large number of the pharmaceuticals were made, has shrunk to microscopic proportions or has been converted into a stock room. Not making his own preparations to any extent, our retail pharmacist of to-day is actually forgetting his manipulative pharmacy and therefore overlooks opportunities of research in the way of improving pharmaceuticals for which the official recipe is at times unsatisfactory.

Then, a third factor arises from the notion that modern research must mean huge laboratories, expensive apparatus and extraordinary training. It is this fallacy that I most desire to combat even though it means taking issue with some of my closest friends. These exponents of the expensive equipment and the extraordinary training idea overlook such facts as the discovery of morphine by Sertürner in his little apothecary shop in Eimbeck. They talk about "crude work unscientifically handled." True, Sertürner's work was crude but it was the beginning of that wonderful line of research known as alkaloidal chemistry. Perhaps my friend may say "That was over a century ago and the present century demands more refined research." Then suppose we take the greatest chemical discovery of the last twenty-five years; the discovery that has revolutionized our entire chemical thought. The basic work leading to this tremendous discovery was not done by one of the Great in Chemistry and in a five-million dollar laboratory. It was carried on, if tradition be right, in a simple room, a kitchen, it is even said, with tin pans and earthenware crocks as the most largely used appliances. Yet with these crude implements, the then comparatively unknown workers Professor and Madame Curie, by their isolation of radium, placed themselves among the Great in Chemistry. This statement in no manner detracts from the magnificent work following the discovery of radium carried out by Thomson, Rutherford and Millikan, culminating in our present-day knowledge of the structure of the atom, work that really did require remarkable and expensive apparatus and the appointments of an admirably equipped laboratory. My contention is that both types of research are essential; that important though expensive and highly accurate research may be, it ill befits that type of investigator to sneer at simpler research, honestly conceived, honestly carried out.

My view of research is that it is the search after the truth; that simple seeking after the truth is oftentimes more important than elaborate investigation, even as simpler forms of worship are perhaps more acceptable to the Deity than elaborate ceremonials. Applying this thought pharmaceutically, a vast field of simple and yet important research is awaiting those retail pharmacists willing to devote a part of their leisure time to the laboratory rather than to the automobile or the golf links. The list of research topics appended to this shows numerous pieces of research within the scope of the back-room of the drug store, pieces of research that will bring results of far greater importance to pharmacy than studies of hydrogen-ion concentration or of molecular weight determinations.

A few of these practical and vital problems are here suggested.

1. Pharmacopœial Research.—By this heading I mean the investigation of the pharmaceuticals of the Pharmacopœia and the National Formulary. There is no greater need in U. S. P. and N. F. revision than volunteers from the rank and

file of retail pharmacy who will check up proposed changes in recipes by making up the preparations on a commercial scale (one liter or more) and then report to the chairman of the U. S. P. and N. F. Revision Committees as to whether the proposed recipe yields a better or a poorer product than the recipe now official. This is the object of the auxiliary committees that proved of such value in the preparation of U. S. P. X. This idea should be extended so as to include the National Formulary by the creation in each state association of a committee on U. S. P. and N. F. preparations, such committee to consist of retail pharmacists each of whom will pledge himself to try out in his store the proposed changes in the recipes of official products. I am experienced enough in state association affairs to know the difficulty in getting the right kind of men to do real work on committees, but if most state associations can have live legislative committees, why should not they have equally live committees on U. S. P. and N. F. preparations?

2. *Incompatible Prescriptions.*—There is no more important work along the lines of pharmaceutical research than the reporting and collating of incompatible prescriptions. This work can be done only by the practicing prescriptionist; the retail pharmacist or the hospital pharmacist. It is work akin to the main line of research published by the practicing physician, the reporting of unusual cases. The field of incompatibilities is an almost limitless one and as long as physicians prescribe mixtures, so long will occasional incompatibilities bob up and were every pharmacist in this state to report each year the incompatible prescriptions compounded in his store and were these reported cases compiled and presented at the annual sessions of this association, that report would constitute one of the most interesting hours of your convention. Not only would such a report be interesting reading but it would also be of the greatest service to medicine. Despite repeated warnings, physicians will prescribe the newer synthetic remedies with other medicaments and that with frequently ensuing incompatibilities, sometimes (as in the case of quinine-acetylsalicylic prescriptions) with the production of toxic by-products. Were these and all other types of present-day incompatible prescriptions brought before this ASSOCIATION each year, were they published in brochure form by the ASSOCIATION for distribution among medical men, such a procedure would do more to stimulate prescription business than any other agency I can imagine.

Obviously, this idea is not original with me. Such "prescription clinics" as they were called by that great pharmacist, Henry P. Hynson, have been a popular feature of a number of A. PH. A. conventions and I only advocate their extension as a serious part of the work of state associations.

3. *Business Research.*—In the appended list of research topics Nos. 64, 65 and 66 are subjects that could keep our retail pharmacists busy during spare hours for many years to come. But one illustration will suffice, the classification of the ingredients of prescriptions as worked out by the Commonwealth Foundation. This checking of 1000 prescriptions per store can only be done in the retail pharmacy and the results of the compilation will be of value not merely to pharmaceutical educators but also to those conducting the revision of the Pharmacopœia and the National Formulary.

From a purely selfish standpoint the research of the greatest service to the retail pharmacist is the survey of the cost of conducting the drug business such as

carried out by the Harvard Business School a few years ago. That such surveys should be conducted at least once every five years and that every retailer should help in this work goes without saying.

4. "Pure" Research.—In the correspondence leading up to the organization of the National Conference on Pharmaceutical Research I used the phrase "pure research" when writing to an eminent non-pharmaceutical research worker. He responded with a sharp criticism of the phrase, showing his broadmindedness by stating that while he engaged in what was popularly called "pure" research, he considered honest technical research as "pure" as the most non-technical research ever performed. This view coincides with my opinions expressed a few pages ahead and I will only add that one never knows when a piece of work of the most highly theoretical character may become of the greatest importance to the technical world. The title "pure research" given as the heading of this chapter is used merely as a differentiation from the technical lines of investigation suggested until now as fruitful fields of endeavor for the retail pharmacist and at this time while I would like to point out a number of pieces of work within the scope of the pharmacist's time and appliances, one illustration will have to suffice—Research Topic No. 17, compound solution of phosphates.

It is true the topic as printed states "study of manufacture and preservation from the standpoint of hydrogen-ion concentration," which is of course a task for the well-equipped chemical laboratory, but it is also true that the amended recipe of N. F. V is the result of the experience of making some 50 samples of slightly varying proportions and that further experimentation on purely pharmaceutical lines are still much needed. I am even Philistine enough to express the opinion that while hydrogen-ion studies of this preparation may aid us in telling us the "whys" of this preparation, the more or less empiric pharmaceutical method of approach may tell us far more about the "hows" of the preparation, the phase that is most likely to bring a perfect preparation.

And now in closing, let me add these last words to those of my hearers who may think that I have not made a case for research in pharmacy. These may say research is not for the average retail pharmacist. That is indeed very true. There is a very real research temperament, a research spirit, and this spirit of research is akin to the spirit of altruism. And yet remarkable and paradoxical though it may sound, the fact remains that many of those retail pharmacists who have manifested the spirit of research by a willing devotion of time to experimentation learned practical facts that made them wealthy. All of us with thirty or more years of pharmaceutical experience can recall a number of wealthy men of to-day who stumbled across their money-making specialties while "puttering around" in the back-room of the drug store.

Research is not a fickle goddess like Fortune. She does not always bestow her highest favors upon her devotees, but few indeed are those who honestly and industriously seek her aid and go away from her empty-handed.

NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH.

TOPICS FOR RESEARCH.

(Suggested in Census of Pharmaceutical Research 1925.)

Dispensing Pharmacy.

1. Ampuls, action of distilled water on glass of.
2. Digitalis, an official preparation designed for hypodermic use.

Manufacture of U. S. P. and N. F. Pharmaceuticals.

3. Stability of pharmaceutical preparations as determined by two factors:
   (*a*) Natural composition.
   (*b*) External influences.
4. Causes of precipitation in galenicals.
5. Preservation of U. S. P. products.
6. Systematic study of the influence of hydrogen-ion concentration upon the stability of U. S. P. and N. F. preparations.
7. Function and value of adjuncts to menstrua used in preparing fluidextracts and extracts.
8. Extraction processes for both vegetable and animal drugs.
9. Absorption of medicinal substances from various ointment bases.
10. Colloidal phenomena in pharmaceutical practice.
11. Arsenic trioxide, study of solubility in water, including the influence of the physical form of the As_2O_3 upon its solubility.
12. Infusion of Digitalis, further study of methods of preparation.
13. Uniform preparations containing stable, non-irritating forms of iron cacodylate.
14. Changes in composition of Potassa Sulphurata during aging.
15. Sanguinaria preparations, cause of precipitation in.
16. Spirit of nitrous ether, further study of methods of manufacture.
17. Compound solution of phosphates, study of manufacture and preservation, from the standpoint of hydrogen-ion concentration.

Tests for and Assays of U. S. P. and N. F. Pharmaceuticals.

18. General methods for accurate and quick assay of pharmaceuticals.
19. Application of standardized colorimetric assays to the accurate determination of minute amounts of alkaloids and other active plant principles in galenicals; such as
   (*a*) Determination of the morphine content of paregoric.
   (*b*) Assay of the active constituents of digitalis.
20. Fluidextracts and extracts, improved methods of assay.
21. Study of U. S. P. assays for fluidextracts with a view of hastening the extractions or reducing the amount of work in extracting.
22. Further study of a systematic scheme of separation of synthetic chemicals as found in pharmaceuticals.
23. Study of the sulphur absorption value of fats with particular reference to the assay of sulphur ointment.

Manufacture of Medicinal Chemicals.

24. Synthetic drugs in general and the connection between chemical structure and physiological action.
25. Development of synthetic non-habit forming substances to take the place of morphine and cocaine.
26. Alcohols containing the tri-chlor-methyl group.
27. Attempts to synthesize certain plant principles of established medicinal value now obtainable almost solely from foreign sources. Among these principles may be cited santonin and caffeine.
28. Studies in the structural relationship between the alkaloids of the cinchona family and attempts to convert the less used alkaloids such as cupreine into the largely used quinine.

29. Further study of the anthraquinone bodies with view of producing, from the basic principles, mixtures similar in pharmacologic action to the well-known purgative drugs such as rhubarb, senna and cascara sagrada.
30. Synthesis and pharmacology of ephedrin.
31. Synthesis of santonin or study of the chemico-therapy of same leading to preparation of a synthetic to take its place.
32. Synthesis of cantharidin or work along similar lines as above.

Tests for and Assays of Medicinal Chemicals.

33. Colorimetric assays for salicylates, nitrites, nitrates, and ammonia, expressed in terms of standardized colored fluids.
34. Further study of the composition of commercial ammonium carbonate with special reference to the manufacture of aromatic spirit of ammonia.
35. Assay of carbon tetrachloride and estimation in mixtures.
36. Condition of "available chlorine" in pharmaceutical chlorinated solutions and in chlorinated lime.
37. Iron albuminate and iron peptonate; distinguishing tests for.
38. Isopropyl alcohol in ethyl alcohol; improvement in test for.
39. Search for a reliable test for the detection of lactic acid in the presence of citric and phosphoric acids.
40. Sodium cacodylate, study of assay of.

Sources and Identification of Botanic Drugs.

41. Microanalysis.
42. Methods in quantitative microscopy.
43. Preservation and maintenance of standards of drugs.
44. Uniform standards and methods of testing drug materials.

Tests for and Assays of Botanic Drugs.

45. U. S. P. assays, especially assay of opium and of ipecac.
46. Some assay processes; oils of eucalyptus, lemon and santal; nux vomica and its preparations; hydrastis and its preparations.
47. Reforms in methods of chemical assay for alkaloids.
48. Further study, particularly along the lines of physical chemistry, of the problems encountered in the alkaloidal assay of drug plants.
49. Investigation of the possibility of establishing a systematic scheme of the separation of plant principles in galenical preparations.
50. The assay of aloe.
51. The assay of oxgall.
52. Colorimetric assay for anthraquinone drugs.
53. Paramecial method for the biologic assay of digitalis series.

Chemistry of Drug Plants.

54. Do alkaloids exist as such in plant tissues?
55. Plant constituents—bitter principles, resins, tannins, glucosides, etc.
56. Phytochemical and pharmacological study of Southern medical plants, such as *Parthenium hysterophorus, Cephalanthus occidentalis, Saururus cernuus* and *Sarracenia flava.*
57. The chemical constituents of *Passiflora incarnata.*
58. Irritant constituents of teak wood.

Bacteriology and Biologicals.

59. Paramecial method for determining the phenol coefficient of disinfectants.
60. Chemotherapy of tuberculosis and the evolution of a preparation of low toxicity and a high bacteriological value.

Enzymes and Endocrines.

61. Further study of the digestive ferments and of glandular products.
62. The development of uniform methods for conducting vitamin investigations.

63. Isolation of active principles and proper methods for the further standardization of the endocrines or ductless glands.

Statistical Pharmacy and Business Research.

64. Drug-store arrangement (lay-out) to enable druggists to best serve their patrons. This should include the arrangements of prescription departments as well as that for commercial purposes.
65. Permanent continuance of the work of the Commonwealth Fund.
66. Continuance of work on the cost of conducting retail pharmacy similar to that published by the Harvard School of Business.
67. Compilation and classification of the statistics collected by the National Association of Boards of Pharmacy relating to registration and examinations.

Miscellaneous.

(Historical)

68. Compilation of a History of Pharmacy.

(Bibliographical)

69. Compilation of the bibliography of a single subject, comparable to the work now carried on by Kremers and his pupils.

(Pharmacological)

70. Paramecial method for demonstrating the diuretic action of caffeine.
71. Physiological action of codeine, particularly as to its habit-producing property.
72. The physiological action of active constituents of gelsemium.

(Microscopical)

73. Microtechnic for demonstrating proteins in living plant tissues.
74. Protein metabolism in plants.
75. Food microscopy.

(Physical)

76. Redetermination of fusing, volatilization and reaction points of official chemicals, thus replacing present vague statements "strong heat," "red heat," etc.
77. Further studies in the solubilities of official chemicals.

GRANTS MADE TO NATIONAL RESEARCH COUNCIL.

The following appropriations recently made to the National Research Council for the year 1926 give an idea of the work of the Council and the extent to which funds are forthcoming for the support of its various scientific projects. The Executive Board of the Rockefeller Foundation has authorized the appropriation of $125,000 for research fellowships in physics, chemistry, and mathematics, $75,000 for research fellowships in the biological sciences, $50,000 for research fellowships in the medical sciences, $45,000 for International Biological Abstracts, and $5000 for *Concilium Bibliographicum*. The General Education Board has authorized the appropriation of $50,000 for research fellowships in the medical sciences for 1926.

WELLCOME HISTORICAL MEDICAL MUSEUM TEMPORARILY CLOSED.

Since the foundation of the Wellcome Historical Medical Museum in 1913 there have constantly been additions of important historical objects acquired by purchase, donation, and permanent loan. The growth of the collections has been so great that extensive alterations in the museum and a complete rearrangement of the exhibits have become necessary. The reorganization will be of such a thorough character that Director Henry S. Wellcome, has decided to close the institution for several months. Although this may cause a temporary inconvenience to medical and other scientific research workers and students, the change, when effected, will prove of great advantage by rendering the arrangement and classification more systematic and the objects more accessible for inspection and study.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

BRINGING PHARMACY TO HIGH-SCHOOL STUDENTS.

BY C. B. JORDAN.*

For two years I had the honor and the pleasure of serving as Chairman in Indiana for the Garvan Prize Essay Contest conducted by the American Chemical Society. During this time all of the essays from the high-school students of Indiana passed through my hands. Naturally I was interested in the essays on the subject "The Relation of Chemistry to Health and Disease" and I read many of them.

This year I relinquished the chairmanship of this committee but was retained as a member of the committee. The committee is divided into sub-committees and the sub-committee to which I was assigned examined all the Indiana essays on the subject "The Relation of Chemistry to Health and Disease." As a result, I read all of these essays.

This experience has given me food for thought and I wish to pass these thoughts on to the pharmaceutical profession. Before doing this, however, I wish to explain the plan of these Garvan Prize Essay Contests, as some of my readers may not be members of the American Chemical Society and therefore unfamiliar with this contest.

The American Chemical Society has long interested itself with the problem of bringing the science of chemistry to the attention of the every-day man and especially to the attention of the young high-school students who are the prospective students of chemistry. This effort has manifested itself in the numerous articles on chemistry appearing in the daily press. It is a very laudable effort and one that the pharmacists could well afford to imitate.

Three years ago Mr. and Mrs. Francis Garvan donated a sum of money to the American Chemical Society to be used in conducting an essay contest in all of the high schools of the nation, the participants being compelled to write upon one of a series of subjects, all subjects bearing upon the relation of chemistry to some phase of every-day life. The above-mentioned subject is one of this series.

To stir interest in the subject, the Society requested its numerous branches to circularize the high schools of their immediate neighborhood and, if possible, to give talks before high-school students on the subject of the High-School Essay Contest. To provide material for the basis of these essays, the Society distributed to the high schools sets of books bearing upon the subject to be discussed.

In reading the essays on the Relation of Chemistry to Health and Disease, I have been impressed with the fact that these high-school youngsters give *absolutely no* credit to the pharmacist for his assistance in the control of disease. The bacteriologists, the physicists, the chemists and the physicians receive *all* of the credit for our progress in combating disease. In reading fifty or more

* Dean Purdue School of Pharmacy.

papers this year, I failed to find any credit given to the pharmacists, in fact the pharmacists were never mentioned.

That these youngsters should get a distorted view of the subject is to be expected in the wholesale conduct of such essay contests. That they should fail utterly even to mention the pharmacist, is very disappointing. The bacteriologist, the physicist and, of course, the chemist received credit, the latter in a measure far beyond what is deserving. In fact, the chemist is given credit for discovering and developing antitoxins, bacterins, vaccines and everything else, even to such things as meat inspection programs. If you were to believe this material of these essays, you would come to the conclusion that, were it not for chemistry, we would still be practicing medicine as it was practiced in the time of Paracelsus.

Chemistry deserves *great* credit for the assistance it has rendered to the cause of medicine and I will be the last one to minimize the value of this great science. However, I believe that we pharmacists have been "asleep at the switch" in failing to bring to the attention of high-school students the value of pharmacy and the opportunities that it offers to young people who are ready to enter college.

Since September 1923, every college of pharmacy belonging to the American Association of Colleges of Pharmacy has demanded high-school graduation or its equivalent for entrance. This means that the high-school graduating classes are the sole source of our prospective students. If we wish to secure a good grade of entering students, some effort should be put forth to attract these young people to pharmacy. I question the wisdom of an essay contest, but surely a profession as old as pharmacy has an appeal to put forth to the young people who are selecting their life-work.

I have been surprised at the number of students who enter pharmacy with no idea, or at best a hazy one, of the legal requirements governing our profession. This is a condition that can easily be corrected if some central agency, such as the AMERICAN PHARMACEUTICAL ASSOCIATION, should direct a concerted effort toward its correction.

The pharmacists are exceedingly busy in their stores, spending long hours at service and, when opportunity for relief from duty comes, they wish to forget pharmacy in all of its phases and enjoy complete relaxation. Because they spend long hours and busy ones in the conduct of their profession, they do not have the inclination to do missionary work in recruiting prospects for pharmacy. As a result, they are poor advertising agencies for their profession. The average high-school student judges pharmacy by what he sees going on in the front of a drug store, and to him pharmacy is a commerical enterprise just as selling dry goods, shoes, groceries, etc., are commercial enterprises. To him there is little or no distinction between the pharmacy and other retail establishments. Their minds never will be disabused unless we make an effort to show these young people that pharmacy is a calling that renders great service to the community, one that requires a high type of practitioner and demands of him sacrifices that are not demanded or expected of the average retail merchant, but one that, in return for these sacrifices, gives a great deal of satisfaction and contentment on account of humane service well rendered.

How many busy pharmacists are endeavoring to perform this very essential work for the benefit of our calling? I am fully aware of the fact that some are

doing more than their full share of this work. On the other hand, a vast majority of pharmacists are paying little or no attention to it. Is it not time to awaken them to their full responsibility in this matter? Is it not time that a concerted effort be made to put pharmacy before the public in its true perspective?

Every druggist in the United States has many opportunities to correct false impressions and to present true ones if he will only be awake and seeking these opportunities. Nearly every one comes to the "Corner Drug Store" and is known by the operator thereof. What a splendid opportunity is presented in this close contact with patrons. Very many pharmacists belong to luncheon clubs and other civic organizations, thus opening avenues of approach and especially avenues of approach to the intellectual people of their communities. Is there a teacher of science in any high school that will not welcome a short, well-chosen talk upon science in its application to pharmacy and medicine? Such talks are very applicable in classes in botany, chemistry and biology.

As I see it, the opportunities are here if we pharmacists wish to take them. What better service could our AMERICAN PHARMACEUTICAL ASSOCIATION perform than that of awakening the individual pharmacist to a realization of his duty and responsibility in this matter? A committee of this ASSOCIATION could work out methods of arousing the interest of the pharmacist and also methods to be used by them in presenting a true picture of pharmacy to their fellow citizens and especially to the high-school students of the nation.

If such an effort had been made successfully during the past few years, I am sure that the young high-school students writing essays on "The Relation of Chemistry to Health and Disease" would not ignore the great service that pharmacy, through chemistry, has rendered the physicians in this fight to overcome disease.

GREAT BRITAIN RATIFIES OPIUM CONVENTIONS.

Both Geneva opium conventions have been ratified by Great Britain according to an Associated Press dispatch to the New York Times from that city. The first of these conventions, concluded in 1924, provided that the signatory powers would take measures to suppress entirely within fifteen years the consumption of prepared opium in territories under their authority. The second, drawn up in 1925, provided for more effective restriction of the production and manufacture of narcotics and establishing closer control and supervision of international trade in narcotics.

GIFT OF $500,000 FOR THE PHIPPS INSTITUTE.

A gift of $500,000.00 to be devoted to the welfare of the Phipps Institute recently has been made by Mr. and Mrs. Henry Phipps. This Institute was founded by Mr. Phipps for the treatment of tuberculosis and the study and prevention of the dreaded disease. Gifts made by the donors aggregate nearly $3,000,000. Other donations by them have been made to Johns Hopkins and other Institutions.

NEW YORK BOTANICAL GARDENS.

Development of the New York Botanical Gardens along comprehensive lines involves, according to present plans, an outlay of practically $7,000,000. Physical features of the proposed changes call for the establishment of new laboratories, and the plans propose a considerable extension of field work and research, including botanical expeditions to regions of Asia and Africa. Another field for the scientific staff is a study of the diseases of plants, which have a relationship to those of man.

NATIONAL FORMULARY V.

BY OTTO RAUBENHEIMER.

Twenty-two years ago, in 1904, the "Master of Pharmacognosy," Prof. Dr. Alex. A. Tschirch, since 1890, Director of the Pharmaceutical Institute of the University of Berne and an honorary member of our A. PH. A., made the "classic" remark, "The Pharmacopœia is a mirror of its age." The same words hold true as to Formularies; the contents of which show the preparations in use at that time and reflect the pharmaceutic as well as therapeutic knowledge. As an illustration of this let me point out "The New York and Brooklyn Formulary," published in 1883, when an actual "craze" for Elixirs existed and which, consequently, contained 52 formulas for Elixirs in a total of 81 preparations.

HISTORY OF THE NATIONAL FORMULARY.

Since its birth in 1851 the AMERICAN PHARMACEUTICAL ASSOCIATION recognized the need of an authoritative Formulary of uniform preparations not included in the U. S. P. As early as 1856 the President appointed a committee "to collect and report to the next meeting unofficial formulas in local use with many physicians of our Union." At the meeting held in Philadelphia in 1857 this Committee composed of ten members reported formulas for 81 preparations, which was adopted by the ASSOCIATION. At the Washington meeting in 1858 there were 14 additional formulas reported. In his Presidential address at the Philadelphia meeting, in 1868, John Milhau stated "I now make the suggestion to appoint a *Standing Committee on Unofficial Formulas* to prepare a report for publication soon after the appearance of the new Pharmacopœia." (PROCEEDINGS A. PH. A., Vol. 16, p. 32.) The following Committee was then appointed: F. H. Markoe, Boston, Chairman, J. F. Moore, Baltimore, and Albert E. Ebert, Chicago. In 1883 this Committee was enlarged to ten members.

Up to that time a number of local formularies were in use as *f.i.* in Philadelphia, Baltimore, Washington and New York, the latter being called Manual des N. Y. Pharmazeutischen Vereins, the forerunner of the German Apothecaries' Society. About this time elixirs became very popular and in 1883 Prof. John Uri Lloyd published his book "Elixirs" containing 283 formulas. In the same year the "New York and Brooklyn Formulary" was published by a joint committee of the New York College of Pharmacy, the N. Y. Deutscher Apotheker Verein and the Kings County Pharmaceutical Society. Although this little book of 81 formulas was particularly intended to meet the demands of pharmacists in New York City and vicinity, it soon became popular all over the United States. At the Providence meeting of the A. PH. A. in 1886 (Vol. 34, p. 159) the Committee on Unofficial Formulas made a report on a National Formulary and in the PROCEEDINGS for 1887 (Vol. 35) I find for the first time under "Special Committees" a Committee on National Formulary,[1] composed of Charles Rice, Chairman, Wm. P. DeForest, P. W. Bedford, S. J. Bendiner, and Adolph Tscheppe. Based upon the N. Y. and Brooklyn Formulary the first edition of the National Formulary was published as an Appendix to the PROCEEDINGS in 1888 and as a separate book.

The first revision, that is N. F. II, was published in 1896, shortly after the U. S. P. VII was issued in 1894. N. F. III was published in 1906 about one year

[1] Appointed in 1884.

after U. S. P. VIII and N. F. IV became official on September 1, 1916, the same date as U. S. P. IX; the date when the N. F. V will become official soon will be announced. The U. S. P. X became official January 1 of this year. The original intention was to have both books official on the same date, which is indeed very desirable, but owing to unavoidable delay this was found to be impossible. The first pages in the National Formulary give an excellent "Historical Introduction" which can be consulted with profit as it clearly presents the evolution of that work. I must not forget to mention that the Pure Food and Drugs Act of June 30, 1906, made the N. F. a legal standard and placed it on a par with the U. S. P. as a law book. This unexpected and unlooked for status greatly increased the standing of the National Formulary and also made it necessary that its revision be conducted with greater care and by experts in their respective fields.

THE N. F. V REVISION COMMITTEE.[1]

The National Formulary is the property of the AMERICAN PHARMACEUTICAL ASSOCIATION. At the meeting of its council on August 30, 1919, at the New York City Convention the following 15 members were elected to act as a Revision Committee for a ten-year period: Henry V. Arny, Ph.D., New York City; George M. Beringer, Ph.M., Camden, N. J.; E. Fullerton Cook, Ph.M., Philadelphia; H. A. B. Dunning, Phar.D., Baltimore; H. Engelhardt, Ph.D., Baltimore; Bernard Fantus, M.D., Chicago; Oliver A. Farwell, Detroit; Samuel L. Hilton, Ph.M., Washington, D. C.; Charles H. LaWall, D.Sc., Philadelphia; Edwin L. Newcomb, Ph.M., Minneapolis; Otto Raubenheimer, Ph.M., Brooklyn; W. L. Scoville, Ph.M., Detroit; Leonard A. Seltzer, Ph.C., Detroit; Clyde M. Snow, Ph.G., Chicago; and P. Henry Utech, Ph.G., Meadville, Pa. This newly elected Committee to revise N. F. IV or to compile N. F. V organized itself and chose W. L. Scoville as Chairman, George M. Beringer as Vice-Chairman and L. A. Seltzer as Secretary.

The selection of this Committee has the following advantages:

1. Experts in their respective fields.
2. Geographical distribution of the different members throughout the United States, from Maryland to Minnesota.
3. Representation of different branches of pharmacy, such as retail pharmacy, manufacturing pharmacy, chemistry, botany and pharmacognosy, faculties of colleges and last, but not least, one physician and professor.

ANALYSIS OF THE N. F. COMMITTEE.

An analysis shows this Committee to be composed of the following representatives:

6 Retail Pharmacists
4 Professors of Pharmacy and Chemistry
2 Botanists and Pharmacognosists
2 Chemists connected with Manufacturing Pharmacy
1 Physician

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[1] The members of the Revision Committee are shown in Volume X, p. 467, June number of JOUR. A. PH. A., for 1921.

Thus it readily can be seen that two-fifths of the members of the N. F. V Revision Committee, equal to 40 per cent, are retail pharmacists or drug store owners, a fact of which retail pharmacy can justly be proud.

N. F. CONFERENCES.

The work of revising the N. F. is chiefly done by correspondence, as explained in another paragraph. However, it is customary that at each A. PH. A. Convention the N. F. members present get together for a meeting of their Committee. In this way, by personal contact, much excellent constructive work has been accomplished. In realization of this two special conferences have been held of the entire N. F. Committee during the present Revision.

1. The Longport, N. J., Conference, July 1–3, 1920. At this first meeting the N. F. Committee was organized and work was assigned to the different sub-committees who at once began their duties.

2. The Atlantic City Conference, June 28–30, 1921. At this meeting there was a general discussion as to admissions and selections and on new and changed formulas. The different Sub-Committees held separate sessions and action was taken on a number of reports.

These conferences have proven beyond doubt that they are a great help, in fact a necessity, for a speedy and reliable revision of the N. F. Let us hope that this precedent will be kept up in future revisions.

At the Longport Conference, in 1920, the General Principles for the revision were adopted. These were modified slightly in the 1921 meeting and are herewith reported as amended. These principles are being followed in this revision.

GENERAL PRINCIPLES FOR N. F. V.

1. *Scope of the National Formulary.*—The purpose of the National Formulary is to supply definite formulas for preparations sufficiently used in medical practice throughout the U. S.; to provide standards and tests for the identity, quality and purity of essential ingredients used in these formulas that are not standardized by the U. S. P. so that uniformity in physical properties and action of constituents will be assured.

2. *Admissions.*—Any formula in sufficient use by physicians may be admitted into the National Formulary, but no proprietary or trademarked name shall be applied thereto, nor shall it be the aim of the Formulary to supply imitations of proprietary or trade-marked articles.

3. *Arrangement of Subject Matter.*—The contents of the National Formulary shall be arranged in three parts: Part I to contain formulas, Part II standards for non-pharmacopœial ingredients, and Part III special tests, reagents and reference tables.

4. *Construction of Formulas.*—Formulas shall be listed in alphabetical sequence, and whenever practical general formulas for classes may be adopted, the metric system of weights and measures only to be used.

5. *Pharmacopœial Principles Accepted.*—The principles adopted by the U. S. Pharmacopœial Convention of May 1920, to be followed in revising the Pharmacopœia, relating to nomenclature, changes in titles, synonyms, abbreviations, purity rubric, international standards, physical constants, standard temperature, phar-

macognostic descriptions, powdered drugs, solubilities and doses, shall be followed in the revision of the National Formulary.

6. Therapeutic Responsibility.—The National Formulary does not assume any responsibility for the therapeutic value of any drug or preparation.

7. Assay Processes.—Assay processes for as many of the potent drugs and their preparations as may be found practicable, shall be introduced into the National Formulary.

8. Alcohol in Formulary Preparations.—The proportion of alcohol entering into each formula in the N. F. shall be carefully studied and fixed at the minimum necessary for maintaining the activity, solution of the active constituents, permanence or preservation of the preparation. It is recommended that, whenever practicable, a permissible range of the content of absolute alcohol by volume be stated in the Formulary, accompanying the text for each preparation containing alcohol.

9. Enumeration of National Formulary Preparations Containing Official Substances.—There shall be included a table of U. S. P. and N. F. substances showing the official preparations in which they are contained as active ingredients.

10. Modified Dose Statement.—There shall be appended to the dose of each compound preparation a statement of the amount of active ingredients or ingredients in the dose given; and a table of doses of the N. F. preparations shall be added.

11. Publicity.—The National Formulary Committee shall publish from time to time abstracts of important changes or proposed new monographs, and invite comment and suggestion before final adoption.

12. Date of Adoption.—The N. F. Committee shall establish a definite date when the fifth edition of the N. F. shall go into effect.

It readily can be seen that by the adoption of these "General Principles" the N. F. V has a solid foundation. It is built on rock and not on sand! (in spite of the fact that these "General Principles" were adopted on the sandy seashore).

THE DIFFERENT SUB-COMMITTEES.

The Revision Committee of N. F. V divided itself into the following Sub-Committees:

1. Additions, Deletions and Nomenclature
2. Botany and Pharmacognosy
3. Chemicals and Assays
4. Doses
5. Elixirs
6. Syrups and Spirits
7. Fluidextracts and Extracts
8. Tinctures and Fluidglycerates
9. Emulsions, Mixtures, Liquors and Infusions
10. Pills, Powders, Species, Salts, Troches and Pencils
11. Glycerogelatins, Liniments, Lotions, Mulls, Sprays, Oleates, Pastes, Petroxolins and Ointments

12. Miscellaneous Preparations
13. Editing Committee.

The members joined those Sub-Committees for which they were best fitted and thus *it happens that some do work* and good construction work, on as many as five Sub-Committees.

THE WORK OF REVISION.

The next step was that the members of each Sub-Committee elect their own chairman, whose duty it is to supervise the work which he subdivides among the members. The Chairman of each Sub-Committee also circulates Bulletins among the members containing proposals, reports, discussions, comments and, finally, the votes on the adopted formulas or monographs. I might also mention here a very important point, namely, that before final adoption the proposed new or changed formulas are thoroughly tried out on a small and large scale by different members of the N. F. Committee and frequently by other pharmacists and pharmaceutical manufacturers. Consequently the Revision of the N. F. is not only theoretical, but, most important of all, practical, so as to insure the very best results in the finished formulas. After the adoption of a report by the respective Sub-Committees it is then circulated by Chairman Scoville among the entire membership of the N. F. Committees. Criticisms and comments are asked for, which are given due consideration. Last of all a vote is called for and when adopted that part of the N. F. is completed. It readily can be seen that each member of the N. F. Committee votes on every monograph in the book—sometimes even twice—namely in the Sub-Committee and then again in the General Committee. One reasonably would assume that these monographs are as perfect as human hands and brains can make them!

Chairman Scoville, besides the usual Reports of the Sub-Committees and the Voting Sheets, also presents other important questions, proposals, changes, discussions, etc., and it is perhaps needless to mention that all criticisms and comments are given due consideration—in the form of Bulletins. During the present N. F. V Revision over 80 Bulletins containing 450 typewritten and mimeographed pages have been circulated by Chairman Scoville, who deserves full credit for "steering the ship into a safe harbor." It also should be borne in mind that this is a work of love, which is done during spare time. Verily a credit to the entire N. F. Committee.

SCOPE AND PUBLICITY.

The scope of the National Formulary is outlined under paragraph one of the General Principles and has received more attention in the present revision than that of any of the previous editions. The proposed Admissions and Deletions were published in the different pharmaceutical journals, were discussed at the meetings of the various A. PH. A. Branches and other pharmaceutical societies and were then voted upon by the N. F. Committee. Consequently the new book, N. F. V, should be a true representation of the preparations, drugs and chemicals used throughout the United States but not official in the U. S. P. After all, this is the desideratum and primary object of the National Formulary! I must not forget to mention that even a study was made of the preparations listed by different man-

ufacturing pharmacists, so as to ascertain to what extent they are in demand through that channel of the drug trade.

Publicity is stated under paragraph eleven of the General Principles as follows: "The N. F. Committee shall publish from time to time abstracts of important changes or proposed new monographs, and invite comment and suggestion before final adoption." By this action the pharmaceutical profession throughout the United States was given an opportunity to make comments before the publication of the book. In this manner much helpful constructive criticism was received. In fact all branches of pharmacy including wholesalers, importers and manufacturers were anxious to coöperate, so as to make the book as perfect as possible. After all, it is to the interest of every one to help in this way, as the N. F. is a legal standard according to the Pure Food and Drugs Act of June 30, 1906.

PRINTING AND BINDING.

When the Revision of N. F. V was completed, Chairman Scoville arranged the monographs in alphabetical order and ordered the printing. The corrected galley proofs were followed by page proofs. The proofs of N. F. V were mailed not only to the members of the Committee but also to the officers of the A. PH. A., to most colleges and manufacturers and to a number of experts. There is no doubt but the policy adopted in the present N. F. Revision of inviting critical proof-reading has proven fully its practicability and value and will result in a book which will be practically free from errors. The size, style and type will be identical with that of U. S. P. X, as both works are legal standards. The official date of N. F. V will be announced soon.

The binding will be in buckram which material has been found by experience to stand the wear and tear best and should last at least during the next ten years, the life of the N. F. V. As a rule leather binding does not stand the test of time and for that reason buckram has been selected. Pharmacists who are in the habit of making notations in the book are advised to purchase an *interleaved* N. F. V, of which a limited number of copies will be supplied.

In the present paper the author has presented a somewhat condensed account of the evolution of the National Formulary and quite especially of the Revision of N. F. V. This book, a stately volume, is now before us, and the next paper in the April number of the JOURNAL will be devoted to a review of the work itself.

MEMORIAL TO DR. CRAWFORD W. LONG.

Our readers will remember the papers read by Dr. Joseph Jacobs before the ASSOCIATION on Dr. Crawford W. Long, physician-pharmacist of Georgia, the discoverer of ether-anesthesia. Dr. Jacobs was an apprentice in the pharmacy of Dr. Long and throughout his life has evidenced his loyalty to him. On March 30, which is the 84th anniversary of Dr. Long's achievement, a statue will be unveiled in the Capitol as a memorial of his discovery.

John E. Andrus, head of the Arlington Chemical Co. in Yonkers, N. Y. has given $50,000,000 for an institution which is to be a combination hospital, recreation center and orphan asylum with educational facilities for the poor children of Westchester County. The plan provides that the income will, in part, be added to the fund so that eventually the work is to extend to the whole state.

Rear Admiral Edward R. Stitt, Surgeon General of the Navy, is now on an inspection tour of Medical Department activities in the West Indies. It may not be generally known to members of the ASSOCIATION that the Admiral is a graduate pharmacist.

NATIONAL FORMULARY ADDITIONS, DELETIONS, CHANGES IN TITLE AND CHANGES IN COMPOSITION.

ARTICLES ADDED TO THE NATIONAL FORMULARY.

IN PART I.

Acidum Nitrohydrochloricum.
Acidum Nitrohydrochloricum Dilutum.
Ampullæ Caffeinæ Sodio-Benzoatis.
Ampullæ Camphoræ.
Ampullæ Emetinæ Hydrochloridi.
Ampullæ Iodi.
Ampullæ Quininæ et Ureæ Hydrochloridi.
Ampullæ Quininæ Dihydrochloridi.
Ampullæ Sodii Cacodylatis.
Aqua Hamamelidis.

Collodium Bituminis Sulphonati.
Curatio Paraffini.

Dentifricium.
Dentilinimentum Aconiti Compositum.
Dentilinimentum Aconiti et Iodi Compositum.

Elixir Aletridis Compositum.
Elixir Bromidorum Quinque.
Elixir Buchu, Juniperi et Potassii Acetatis.
Elixir Carnis et Ferri.
Elixir Catariæ et Fœniculi.
Elixir Chloridorum.
Elixir Euphorbiæ Compositum.
Elixir Guaranæ et Apii.
Elixir Heloniadis Compositum.
Elixir Hydrangeæ et Lithii.
Elixir Hydrastis Compositum.
Elixir Manacæ Compositum.
Elixir Pepsini Compositum.
Elixir Sabal et Santali Compositum.
Elixir Terpini Hydratis et Creosoti Compositum.
Elixir Tongæ et Salicylatum.
Extractum Gentianæ.
Extractum Hydrastis.
Extractum Opii.
Extractum Sumbul.
Extractum Taraxaci.

Fluidextractum Aconiti.
Fluidextractum Avenæ Sativæ.
Fluidextractum Digitalis.
Fluidextractum Frangulæ.
Fluidextractum Gelsemii.
Fluidextractum Gentianæ.
Fluidextractum Grindeliæ.
Fluidextractum Guaranæ.
Fluidextractum Lobeliæ.
Fluidextractum Manacæ.
Fluidextractum Mitchellæ.
Fluidextractum Nucis Vomicæ.
Fluidextractum Sabal.
Fluidextractum Santali Albi.
Fluidextractum Sarsaparillæ Compositum.
Fluidextractum Stillingiæ.
Fluidextractum Taraxaci.
Fluidextractum Tongæ.
Fluidextractum Trifolii Compositum.
Fluidextractum Tritici.
Fluidextractum Viburni Prunifolii.
Fluidextractum Xanthoxyli.
Formaldehydum Cresolatum.

Infusum Sennæ Compositum.

Lavatio Ori.
Linimentum Ammoniæ.
Linimentum Belladonnæ.
Linimentum Calaminæ.
Linimentum Terebinthinæ.
Liquor Ferri Subsulphatis.
Liquor Iodi et Zinci Phenolsulphonatis.
Liquor Plumbi Subacetatis Dilutus.
Liquor Potassii Iodidi.
Liquor Procainæ Hydrochloridi.
Liquor Sodii Arsenatis.
Lotio Alba Veterinaria.
Lotio Calaminæ.
Lotio Calaminæ Composita.

Magma Bismuthi.

Odontalgicum.
Oleoresina Cubebæ.

Petroxolinum Bituminis Sulphonati.
Pilulæ Ferri Iodidi.
Pilulæ Rhei Compositæ.
Pulvis Aromaticus.

Sal Magnesii Sulphatis Effervescens.
Solutio Mastiches Chloroformica Composita.
Solutio Resinæ Chloroformica.
Spiritus Ætheris.
Spiritus Amygdalæ Amaræ.
Syrupus Cacao.
Syrupus Calcii Lactophosphatis.
Syrupus Hypophosphitum.
Syrupus Thymi.
Syrupus Thymi Compositus.
Syrupsu Trifolii Compositus.

Tabellæ Carbonis Animalis.
Tabellæ Hydrargyri Chloridi Mitis.
Tabellæ Phenolphthaleini.
Tabellæ Santonini.
Tabellæ Santonini Compositæ.
Tabellæ Sodii Bicarbonatis.
Tabellæ Sulphuris et Potassii Bitartratis.
Tinctura Aloes.
Tinctura Antimonii.
Tinctura Arnicæ.
Tinctura Cinnamomi.
Tinctura Colchici Cormi Fortior.
Tinctura Gelsemii.
Tinctura Guaiaci.
Tinctura Guaiaci Ammoniata.
Tinctura Hydrastis.
Tinctura Ipecacuanhæ.
Tinctura Quassiæ.
Tinctura Sanguinariæ.
Trochisci Eucalypti Gummi.

Unguentum Bituminis Sulphonati.
Unguentum Capsici.
Unguentum Hydrargyri Chloridi Mitis.
Unguentum Hydrargyri Nitratis.
Unguentum Iodi Denigrescens.
Unguentum Sinapis.
Unguentum Stramonii.

IN PART II.

Ammonii Valeras.
Anisum.
Arnica.
Avena Sativa.

Bitumen Sulphonatum.
Calcii Hypophosphis.
Cascara Amarga.
Chondrus.
Cinchoninæ Sulphas.
Coriandrum.

Eucalyptus Gummi.

Ferrum Albuminatum.
Ferrum Peptonatum.
Fœniculum.
Frangula.

Gelsemium.
Grindelia.
Guaiacum.
Guarana.

Humulus.
Hydrargyri Oxidum Rubrum.
Hydrastinæ Hydrochloridum.

Lithii Benzoas.
Lithii Bromidum.
Lithii Carbonas.
Lithii Citras.

Manaca.
Matricaria.
Mezereum.
Mitchella.

Oleum Pimentæ.
Oleum Sesami.
Oleum Thymi.
Orthocresol.

Piper.
Potassii Hypophosphis.

Sabal.
Sanguinaria.
Sassafras.
Sodii Arsenas.
Sodii Arsenas Exsiccatus.
Sodii Glycerophosphas.
Sodii Hypophosphis.
Sodii Perboras.
Stillingia.
Strychnina.
Sumbul.

Taraxacum.
Tonga.
Triticum.

Veratrina.
Viburnum Prunifolium.

Xanthoxylum.

Zinci Phenolsulphonas.

ARTICLES OFFICIAL IN THE N. F. IV BUT NOT INCLUDED IN THE N. F. V.

IN PART I.

Acetum Opii.

Collodium Iodi.
Collodium Iodoformi.
Collodium Tiglii.
Cordiale Rubi Fructus.

Decoctum Sarsaparillæ Compositum.

Elixir Calcii Bromidi.
Elixir Calcii Hypophosphitis.
Elixir Cinchonæ Alkaloidorum et Hypophosphitum.
Elixir Cinchonæ Alkaloidorum, Ferri et Calcii Lactophosphatis.
Elixir Cinchonæ Alkaloidorum, Ferri et Pepsini.
Elixir Ferri Hypophosphitis.
Elixir Ferri Lactatis.
Elixir Ferri Phosphatis.
Elixir Ferri Pyrophosphatis.
Elixir Formatum.
Elixir Formatum Compositum.
Elixir Glycyrrhizæ Aromaticum.
Elixir Humuli.
Elixir Hypophosphitum.
Elixir Hypophosphitum et Ferri.
Elixir Lithii Bromidi.
Elixir Lithii Citratis.
Elixir Lithii Salicylatis.
Elixir Pepsini et Ferri.
Elixir Potassii Acetatis.
Elixir Potassii Acetatis et Juniperi.
Elixir Quininæ Valeratis et Strychninæ.
Elixir Rubi Compositum.
Elixir Sodii Hypophosphite.
Elixir Strychninæ Valeratis
Elixir Terpini Hydratis et Diacetylmorphinæ.
Elixir Zinci Valeratis.
Emulsum Olei Morrhuæ cum Calcii Lactophosphate.
Emulsum Olei Morrhuæ cum Calcii Phosphate.
Emulsum Olei Morrhuæ cum Pruno Virginiana.
Extractum Aloes.
Extractum Cinchonæ.
Extractum Jalapæ.
Extractum Podophylli.
Extractum Quassiæ.

Fluidextractum Cinchonæ Aquosum.
Fluidextractum Conii.
Fluidextractum Convallariæ Florum.

ARTICLES OFFICIAL IN THE N. F. IV BUT NOT INCLUDED IN THE N. F. V.—(*Continued.*)

Fluidextractum Helianthemi.
Fluidextractum Paracoto.
Fluidextractum Petroselini Radicis.
Fluidextractum Rhois Glabræ.
Fluidextractum Verbenæ.

Gelatinum Chondri.
Glyceritum Guaiaci.

Infusum Cinchonæ.
Infusum Pruni Virginianæ.
Iodoformum Aromatisatum.

Linimentum Ammonii Iodidi.
Linimentum Tiglii.
Linimentum Tiglii Compositum.
Liquor Alumini Acetico-Tartratis.
Liquor Ammonii Citratis.
Liquor Arsenicalis, Clemens.
Liquor Bromi.
Liquor Ferri Acetatis.
Liquor Ferri Hypophosphitis.
Liquor Ferri Nitratis.
Liquor Ferri Oxychloridi.
Liquor Ferri Oxysulphatis.
Liquor Ferri Protochloridi.
Liquor Guttæ Perchæ.
Liquor Hydrargyri et Potassii Iodidi.
Liquor Hydrargyri Nitratis.
Liquor Hypophosphitum.
Liquor Magnesii Sulphatis Effervescens.
Liquor Picis Alkalinus.
Liquor Potassæ Chlorinatæ.
Liquor Sodii Citro-Tartratis Effervescens.
Liquor Strychninæ Acetatis.
Liquor Zinci et Alumini Compositus.
Liquor Zinci et Ferri Compositus.

Magma Ferri Hydroxidi.
Mistura Ammonii Chloridi
Mistura Camphoræ Acida.
Mistura Camphoræ Aromatica.
Mistura Ferri Composita.
Mistura Guaiaci.
Mistura Olei Picis.
Mistura Opii et Sassafras.

Oleatum Aconitinæ.
Oleatum Atropinæ.
Oleatum Cocainæ.
Oleoresina Lupulini.

Petroxolinum Creosoti.
Petroxolinum Iodoformi.
Petroxolinum Picis.
Petroxolinum Terebinthinæ Laricis.
Pilulæ ad Prandium.
Pilulæ Aloes, Hydrargyri et Scamonii Compositæ.
Pilulæ Antidyspepticæ.
Pilulæ Antimonii Compositæ.
Pilulæ Colocynthidis Compositæ.
Pilulæ Colocynthidis et Hyoscyami.
Pilulæ Colocynthidis et Podophylli.
Pilulæ Glycerylis Nitratis.
Pilulæ Laxativæ Post Partum.
Potassa cum Calce.
Pulvis Gambir Compositus.
Pulvis Kino et Opii Compositus.

Sal Potassii Bromidi Effervescens.
Sal Vichyanum Factitium Effervescens cum Lithio.
Soda cum Calce.
Sodii Boro-Benzoas.
Succus Citri et Pepsinum.
Syrupus Calcii Hypochlorophosphatis.
Syrupus Cimicifugæ Compositus.
Syrupus Codeinæ.
Syrupus Ferri et Mangani Iodidi.
Syrupus Ferri Hypophosphitis.
Syrupus Ferri Lactophosphatis.
Syrupus Ferri Protochloridi.
Syrupus Morphinæ et Acaciæ.
Syrupus Papaveris.
Syrupus Rubi Fructus.
Syrupus Sanguinariæ.
Syrupus Sennæ Compositus.
Syrupus Sodii Hypophosphitis.

Tinctura Caramellis.
Tinctura Ergotæ Ammoniata.
Tinctura Kino et Opii Composita.
Tinctura Krameriæ.
Tinctura Paracoto.
Tinctura Pimpinellæ.
Tinctura Zedoariæ Amaræ
Trochisci Carbonis Ligni
Trochisci Gambir.
Trochisci Menthæ Piperitæ
Trochisci Phenolphthaleini.
Trochisci Quininæ Tannatis.
Trochisci Santonini.
Trochisci Santonini Compositi.
Trochisci Sulphuris et Potassii Bitartratis.

Vinum Antimonii (replaced by Tinctura).
Vinum Aurantii Compositum.
Vinum Carnis.
Vinum Carnis et Ferri (replaced by Elixir).
Vinum Colchici Cormi (replaced by Tinctura).
Vinum Colchici Seminis.
Vinum Ferri.
Vinum Ferri Amarum.
Vinum Fraxini.
Vinum Ipecacuanhæ (replaced by Tinctura).
Vinum Pepsini.
Vinum Picis.
Vinum Pruni Virginianæ.
Vinum Pruni Virgininanæ Ferratum.
Vinum Rhei Compositum.

IN PART II.

Absinthium.
Antimonium Sulphuratum.

Cascarilla.
Convallariæ Flores.

Fraxinus.

Guaiaci Lignum.
Gutta Percha.

Helianthemum.

Krameria.

Macis.
Mangani Sulphas.
Menyanthes.

Papaveris Fructus.
Paracoto.
Petroselini Radix.
Pimpinella.
Plumbi Carbonas.

Quininæ Glycerophosphas.
Quinininæ Valeras.

Rhus Glabra.
Rubi Fructus.

Strontii Carbonas.
Strychninæ Glycerophosphas.
Strychninæ Valeras.
Succus Citri.

Terebinthinæ Laricis.

Verbena.
Vinum Xericum.

LIST OF CHANGES IN FORMULAS.

Aqua Hamamelidis—Strength specified.

Collodium Salicylicum Compositum — Now made by volume.
Collodium Stypticum—Now made by volume.

Elixir Anisi—Alcohol reduced.
Elixir Cascaræ Sagradæ—Licorice flavor used.
Elixir Ferri Pyrophosphatis, Quininæ et Strychninæ—Alcohol reduced.
Elixir Gentianæ—Alcohol reduced.
Elixir Gentianæ et Ferri—Alcohol reduced.
Elixir Gentianæ Glycerinatum—Flavor changed.
Elixir Glycerophosphatum Compositum —Alkaloid salts changed.
Elixir Pepsini et Bismuthi —Pepsin increased.
Elixir Pepsini et Rennini Compositum — Rennin increased, alcohol reduced.
Emulsum Olei Morrhuæ cum Vitello—Alcohol added.
Extractum Euonymi—Weaker alcoholic menstruum.
Extractum Krameriæ—Strength increased.

Fluidextractum Angelicæ Radicis—Alcohol reduced.
Fluidextractum Apocyni—Glycerin eliminated.
Fluidextractum Arnicæ—Alcohol increased.
Fluidextractum Bachu Compositum — Alcohol increased.
Fluidextractum Calendulæ —Alcohol reduced.
Fluidextractum Columbæ —Glycerin eliminated, alcohol reduced.
Fluidextractum Dioscroeæ —Alcohol reduced.
Fluidextractum Euonymi —Alcohol reduced.
Fluidextractum Geranii—Glycerin eliminated.
Fluidextractum Juniperi—Alcohol increased.
Fluidextractum Leptandræ —Alcohol increased.
Fluidextractum Mezerei—Alcohol reduced.
Fluidextractum Sanguinariæ—Acid changed.
Fluidextractum Stillingiæ Compositum — Glycerin eliminated.
Fluidextractum Stramonii —Alcohol increased.
Fluidglyceratum Cascaræ Sagradæ Aromaticum—Lime reduced, magnesia added.
Fluidglyceratum Glycyrrhizæ—Ammonia eliminated.

Glyceritum Bismuthi—Bismuth increased.
Glyceritum Pepsini—Acid reduced.

Linimentum Sinapis Compositum — Menthol added.
Linimentum Terebinthinæ Aceticum—Rose water eliminated.
Liquor Alumini Subacetatis — Proportions changed.
Liquor Antisepticus—Salts eliminated.
Liquor Aromaticus Alkalinus—Sodium benzoate eliminated, proportions changed.
Liquor Cocci—Alcohol eliminated.
Liquor Ferri Albuminati—Albuminized iron used.
Liquor Ferri Peptonati—Peptonized iron used.
Liquor Ferri Peptonati et Mangani — Peptonized iron used.
Liquor Pepsini—Acid reduced.
Liquor Pepsini Antisepticus—Acid reduced.
Liquor Pepsini Aromaticus—Acid reduced.
Liquor Phosphatum Compositum — Potassium eliminated, acids reduced.
Liquor Sodæ et Menthæ—Alkali increased.

Mistura Adstringens—Formula changed, product unchanged.

LIST OF CHANGES IN FORMULAS.—(*Continued.*)

Mistura Rhei Composita—Glycerin reduced.

Pasta Zinci Mollis—Oleic acid added.

Petroxolinum Liquidum—Proportions changed.

Syrupus Ammonii Hypophosphitis—Glycerin reduced.

Syrupus Asari Compositus—Sucrose reduced.

Syrupus Calcii et Sodii Hypophosphitum—Glycerin added, sucrose reduced.

Syrupus Phosphatum Compositus — Potassium eliminated, acid reduced.

Syrupus Phosphatum cum Quinina et Strychnina—Potassium eliminated, acid reduced.

Tinctura Antiperiodica—Quinine hydrochloride used.

Tinctura Ferri Citrochloridi—Sodium citrate reduced.

Tinctura Iodidorum—Sodium thiosulphate eliminated, strength reduced.

Tinctura Iodi Fortior—Potassium iodide increased.

CHANGES IN LATIN TITLES.

N. F. IV.	N. F. V.
Elixir Trium Bromidorum.	Elixir Bromidorum Trium.
Fluidextractum Euphorbiæ Piluliferæ.	Fluidextractum Euphorbiæ.
Glyceritum Picis Liquidæ	Glycritum Picis Pini.
Liquor Antisepticus Alkalinus.	Liquor Aromaticus Alkalinus.
Liquor Auri et Arseni Bromidi.	Liquor Auri Bromidi et Arseni.
Liquor Sodii Arsenatis, Pearson.	Liquor Sodii Arsenatis Dilutus.
Mistura Pectoralis, Stokes.	Mistura Pectoralis.
Stili Acidi Salicylici Dilubiles.	Stili Acidi Salicylici.
Syrupus Ficorum Compositus.	Syrupus Ficus Compositus.
Syrupus Pini Strobi Compositus.	Syrupus Pini Albæ Compositus.
Syrupus Pini Strobi Compositus cum Morphina.	Syrupus Pini Albæ Compositus cum Morphina.
Tinctura Cocculi Indici.	Tinctura Cocculi.
Tinctura Ferri Citro-Chloridi.	Tinctura Ferri Citrochloridi.
Tinctura Iodi Decolorata.	Tinctura Iodidorum.
Tinctura Pectoralis.	Tinctura Opii et Gambir Composita.
Boldo.	Boldus.
Cocculus Indicus.	Cocculus.
Euphorbia Pilulifera.	Euphorbia.
Pix Lithanthracis.	Pix Carbonis.

PHARMACY AND THE PRESS.

The *Pharmaceutical Journal and Pharmacist* of January 30th, p. 106, refers to an editorial survey in that publication on the subject by stating that "until recently the pharmacist had no great reason to thank the lay Press for the publicity it gave to pharmacy" "hardly needs endorsement. For many years practically the only references made in the newspapers to chemists (we were never termed 'pharmacists') were connected with allegations of overcharging and substitution. Nowadays the position has improved somewhat. Fair publicity has been given to the Society's efforts to raise the standard of pharmaceutical education, to place pharmaceutical service in the Army on a satisfactory basis, and to other matters which concern the welfare of the public as well as that of pharmacy. The determining factor, speaking generally, in regard to what is published in the Press is the 'news value' of the subject, and if that is lacking there is little hope of valuable space being accorded to anything affecting pharmacy, no matter how important the subject may be to the pharmacist. When circumstances render it desirable that the public should be made well informed on a pharmaceutical question, much can be done by preparing in a concise form suitable matter for the Press and presenting it to the newspapers and agencies. The expert who 'knows the ropes' is needed for the purpose, and something on the lines of a Press bureau is a prerequisite for successful pharmaceutical publicity work."

Publicity in the American Press has been improving for a number of years; items to be acceptable must carry a message or have some point of interest for the average reader. Publicity should be encouraged by contributions that serve pharmacy.

RURAL PHARMACIES' PLIGHT IN GERMANY.

The *Chemist & Druggist*, in a recent issue, states that "there is a large number of pharmacies in rural districts in Germany, and also on the edge of the large towns, which yield scarcely enough profit to provide a livelihood for the owner, who is consequently compelled to work alone. Recently conditions have become even worse, and the situation of these unfortunate owners has now become an acute problem. The Deutscher Apotheker-Verein, in drawing the attention of the Government to the urgent necessity of doing something on behalf of these pharmacists, suggests that veterinary surgeons should be deprived of the right of dispensing medicines; further, that in certain instances the communal authorities should be empowered to pay a subsidy to those owners whose businesses are being run practically at a loss, in order to ensure an adequate pharmaceutical service in the interests of the inhabitants."

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

Article IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter.

BALTIMORE.

The January meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Hotel Emerson on Wednesday evening, January 27, 1926, Vice-President Chas. C. Neal presiding.

Dr. Samuel L. Hilton of Washington spoke on the subject "The Proper Preparation and Manipulations Necessary in Preparing Ampuls."

The address was particularly interesting and instructive as Dr. Hilton not only told in detail the technique of filling and sealing the ampuls, but exhibited samples of the empty ampuls to show quality of glass desirable, the excellent condition of ampuls that he had prepared for a previous demonstration and which had been kept for nearly three years, and the handy cartons which he used for the packaging of ampuls.

He reminded those present that ampuls were fast becoming popular as a means of medication not only on account of furnishing a finished product easily handled by the physician, but also on account of the psychological effect on the patients in observing that separate ampuls are available for individual treatment.

He called particular attention to the desirability in preparing ampuls of using only absolutely neutral glass, which could be determined by boiling for ten minutes with phenolphthalein solution; and also of using neutral solutions in filling ampuls. He emphasized the necessity of using fresh double distilled water for all solutions, of exercising special care in filtering, and exhibited a Berkefeld filter which he employed when preparing mercury succinimide and other ampuls.

Dr. Hilton also stated that in sterilizing all glassware he had found it necessary to use the hot air sterilizer and a temperature of 160° C. to destroy certain bacilli, such as Timothy bacilli, and emphasized the importance of care in preparing ampuls that would be decomposed if subjected to sterilization in an autoclave. He indicated the necessity of careful inspection so as to detect any fine particles of silica that might prove injurious in the solutions; and to detect any possible crystallization of such substances as Tartar Emetic when incorporated in ampuls intended for the treatment of tropical diseases. He also pointed out the advisability of adding 2% sodium citrate to solutions intended for intravenous use, to prevent coagulation of the blood.

One especially pleasing suggestion was that pharmacists, on account of the care necessary in preparing ampuls, should expect a fair return of profit in comparison with the cost of the medicament used.

In welcoming him as a member of the Baltimore Branch, Editor E. G. Eberle was assured that his connection not only would add prestige, but that the Branch would benefit by his assistance and advice.

The yearly election resulted in a reëlection of the previous officers. They are

Robert L. Swain	*President*
Chas. C. Neal	*Vice-President*
B. Olive Cole	*Secretary-Treasurer*

Committee on Membership.—Wilmer H. Schulze, *Chairman;* L. M. Kantner; Miss Carrie G. Mossop.

Committee on Professional Relations.—George P. Hetz, *Chairman;* James A. Black; L. S. Williams.

Committee on Science and Practice of Pharmacy.—Dr. J. Fuller Frames, *Chairman;* John C. Krantz, Jr.; Wm. F. Reindollar.

Committee on Education and Legislation.—

Dr. E. F. Kelly, *Chairman;* Dr. Samuel Y. Harris; Dr. J. Carlton Wolf.

The soloist of the evening was Robert David Mugford, Tenor, of the Peabody Institute.

FEBRUARY.

The February meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the School of Pharmacy of the University of Maryland, on Friday, the 19th, Dr. R. L. Swain presiding.

The speaker of the evening was Dr. Paul S. Pittenger of Philadelphia, Pa., who is well and favorably known among Baltimore pharmacists. He presented the subject "Compulsory Biologic Assays of the U. S. P. X" in a very interesting and instructive manner, supplementing his talk by demonstrations with charts and live animals.

Dr. Pittenger stated that biological standardization was adopted for certain substances, not with the idea of conducting experimental pharmacology, but for the purpose of furnishing uniform preparations, the biological assays presenting methods of measuring the activity of the drugs quantitatively, and the means of eliminating variation by the definite adjustment of the preparation to uniform activity. He stated that the biological assay was the only valuable test for substances of which the active principle has not been determined, or of drugs where the active principle, although determined, cannot be isolated quantitatively in pure form by chemical assay; and that the biologic tests were not intended primarily as checks on chemical assays.

Dr. Pittenger stated that the emergency drugs were the ones generally assayed biologically, thus insuring for the physician instruments of precision in combating disease, and enumerated the drugs that were standardized in the U. S. P. X by compulsory biological assays. He stated that the biological assays were of three types—1st, the toxic type, exemplified by the "One Hour Frog Method" for Digitalis; 2nd, the type of assay where the entire animal was used, such as the assay of Cannabis by the use of the dog, and Ergot on the cock's comb; and 3rd, the type of assay where the specific effect on an isolated organ was noted, as in the assay of Pituitary Extract.

Dr. Pittenger demonstrated the "One Hour Frog Method" for Digitalis, the Cock's Comb Method for Ergot, and the Blood Pressure Method on the Dog for Epinephrin; and by means of charts explained the other compulsory biologic assays of the present U. S. P.

Music for the occasion was furnished by the student orchestra of the School of Pharmacy.

B. OLIVE COLE, *Secretary-Treasurer.*

CHICAGO.

The Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was highly honored on the occasion of its 156th meeting, Monday evening, February 8, 1926, at the University of Illinois, School of Pharmacy Bldg., by the presence of Dr. W. W. Charters of the College of Education, University of Chicago. The meeting was called to order by President Kolb who stated that Dr. Charters would introduce for discussion one of the most important and valuable pieces of work in connection with the present and future of Pharmacy that has ever been accomplished in this country.

Dr. Charters had with him and presented to the large audience the practically complete copy of the report of the committee appointed by the Commonwealth Fund for the Study of the Pharmaceutical Curriculum. Dr. Charters presented a splendid résumé of the report in his usual able and interesting manner dwelling particularly upon the values from an educational standpoint of various features of the report. He did this because the faculties of the University of Illinois, School of Pharmacy and the Valparaiso School of Pharmacy were both so well represented.

In the extended discussion that followed many present took part including Dean Day, Professor Clark, Messrs. Christensen, Storer, Becker, Gray and Linke.

E. N. GATHERCOAL, *Secretary.*

DETROIT.

The February meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Wayne County Medical Building, Friday, February 5, 1926. A chicken dinner was served at 6.30 P.M.

The meeting was called to order by President L. W. Rowe at 8.15 P.M. Owing to the late start the reading of the minutes was dispensed with.

Mr. Seltzer read an amendment to the Constitution of the Branch. It follows:

Amendment to the Article III of the Constitution: Strike out the word "and" following the word "Program Committee" and add "of the A. PH. A., and one member representing

each of the local pharmacy schools, one from the school at Ann Arbor and two representing the clerks of Detroit and vicinity who shall form the Council of Students and Clerks."

Mr. Seltzer explained his idea was to promote greater interest in the A. PH. A. by the students and clerks.

The amendment was placed on the table for 30 days.

President Rowe then introduced the speaker of the evening, Dr. H. V. Arny, Past-President of the AMERICAN PHARMACEUTICAL ASSOCIATION and Professor of Chemistry in the Pharmacy Department of the Columbia University.

Dr. Arny gave a very interesting talk on Standardized Colored Fluids; he accompanied his talk with illustrations. Mr. Gabel of Parke, Davis and Company assisted Dr. Arny in preparing several solutions to demonstrate his color theory.

A general discussion followed, participated in by Messrs. Seltzer, Webster, Hall, Stocking, Gabel, Gorenflo, Lakey, and others.

After a rising vote of thanks to the speaker the meeting adjourned.

The March meeting was held Friday, March 12. The speaker of the evening was Dr. A. L. Jacoby, City Psychiatrist, who spoke on "Crime and Its Cure."

BERNARD A. BIALK, *Secretary.*

PHILADELPHIA.

The February meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Friday, February 5, at the P. A. R. D. Building, President Smith presiding.

The minutes of the previous meeting were read by the Secretary and approved. Three new members to the parent ASSOCIATION were introduced and accepted as Branch members: George W. Fehr, 1500 S. Broad St., Alex. G. Keller, 161 N. Second St., and Conda M. Diehl, 3703 Chestnut St., Philadelphia, Pa.

At the suggestion of the Branch, the President appointed a Committee of three—W. W. McNeary, A. G. Keller and Raymond Hendrickson—to consider ways and means of increasing the membership of the Branch and to report at the March meeting.

W. W. McNeary was introduced as the speaker of the evening and he read a most interesting paper on "What Should the Pharmacist Manufacture?" While the paper was comparatively short it was full of "real ammunition" and it started a discussion which lasted for more than an hour. Briefly, Mr. McNeary would have the pharmacist manufacture:

1. Whatever articles he can prepare better than he can buy.
2. Preparations which readily deteriorate.
3. Products which can be made more cheaply than they can be purchased.
4. Those which require only simple technique.
5. Preparations where accuracy is not dependent upon physiological assays, etc.
6. Those articles which do not require elaborate and extensive apparatus or machinery.
7. Products which are sold under one's own name.

A lively discussion followed the reading of the paper, the following members taking part: Hendrickson, Swain, Keller, Jenkins, Nichols, Dean, Hunsburger, and Harrisson.

Mr. Hendrickson stated that the paper was so interesting and would be of such value to so many pharmacists that it should be sent to the JOURNAL OF THE A. PH. A. in its entirety for publication, a motion being so made and passed.

The president appointed as Committee on Nominations: E. F. Cook, W. E. Harrisson, and Ambrose Hunsberger, to report at the March meeting.

The usual Branch dinner at the Longacre Hotel was partaken of earlier in the evening by most of those present.

ADLEY B. NICHOLS, *Secretary.*

UNIVERSITY OF WASHINGTON.

The January meeting of the University of Washington Branch met at Bagley Hall, January 21, at 8 P.M., President Bradshaw presiding. Fifty members were present. The preliminary business meeting was dispensed with and the President introduced the speaker of the evening, Mr. A. W. Johnson, Executive Clerk, of the office of The Federal Prohibition Administrator. Mr. Johnson presented a very clear outline of the rules affecting the procuring and dispensing of alcohol in this state. Due to the laws of the state alcoholic beverages are not dispensed on prescriptions or any other way (legally). Hence the rules are relatively simple and the pitfalls for the druggist few. All members were interested in the subject and the speaker was bombarded with questions and presented with hypothetical cases until

one might think a loophole was being sought for. The speaker had his subject well in hand and succeeded in avoiding any pitfall. The closing remarks of Mr. Johnson seem worth while repeating as they reflect the coöperation between the druggists of the state and the Department.

"Coöperation between the profession of Pharmacy and Prohibition enforcement, as provided under existing laws, would seem, of necessity, to be mutually advantageous and protective. During the six years, almost to a day, of National Prohibition, the pharmacists as a whole, both in this state and throughout the country as well, have rendered an invaluable service in the way of an intelligent and effective coöperation with prohibition officers, and as a result of this attitude, it may be truthfully said that the business of pharmacy has not only rendered a distinct and appreciated service to law enforcement officers, but an added dignity and respect to a law that has been the object of more subtle propaganda and invective than perhaps any other law ever enacted. The profession of pharmacy is one, by reason of its very nature and service, of first and increasing importance. It demands and, to succeed, must have for its members men and women of high character and of more than an average standard of intelligence. Not only that, but it is a profession that demands and is distinguished for its high ethical standards of business. This statement is made advisedly, for during my six years as head of the office work of the Federal Prohibition Director of this state, having immediate charge of the permissive feature of the law, it has been my privilege and pleasure to meet and know most of the retail druggists holding alcohol permits in this state, of whom there are approximately 500 at this time, not including other classifications of permittees and, with few exceptions—very few—I have found the drug personnel to be composed of men and women of more than average intelligence and of a better professional ability than is frequently found in many other professions and lines of business. As in every other profession and business, there are, here and there, so-called druggists who are unfit and undesirable, and whose very connection with the business is hurtful—unjustly, it is true—to the whole profession. Such men are neither motivated by any professional pride nor worthy ambition to build up a legitimate, reputable business. Neither have they even the semblance of regard for business ethics and professional standing. In plain words, they are either natural born violators of law and order or have, through certain weakness of character and inability to resist temptation, become degenerate, and finally land in the clutches of the law. Such cases are most frequently found to be bootleggers or dope peddlers masquerading as druggists. If they are fortunate or unfortunate enough to secure permits to use alcohol and narcotics, they seem to have the idea that they can fool the government and divert their alcohol to the more profitable bootleg channels by falsifying their records and other means of concealment. They may be able to do so for a while, but the instances are rare, indeed, when such offenders have escaped detection for any considerable length of time. This brings us to the point where coöperation between the pharmacist and prohibition officer is of the greatest importance in its mutual service. The prohibition officer is the one to whom the pharmacist naturally and properly looks to help him rid and cleanse his profession of such offenders and thus protect the reputation of his business. The prohibition officer, in turn, looks to the ethical pharmacist almost as his ally in safeguarding his alcohol from misuse and improper diversion and to keep him confidentially informed of any druggist wilfully violating the terms of his permit."

H. A. LANGENHAN, *Secretary.*

PLANT DRUGS IN HONDURAS.

Honduras abounds in many plants and other botanical growths having important industrial uses and valuable medicinal properties. While there is no organized industry for the production of these natural products, a few of them are gathered by the natives and exported in considerable quantities.

The principal articles produced, according to Consul George P. Shaw of Tegucigalpa, are chicle, crude balsam, styrax, and sarsaparilla root. Practically the entire production of these commodities is shipped to the United States, a very small amount going to Germany. In the past Russia was the best market for sarsaparilla root, but none is shipped there at the present time. San Pedro Sula, Department of Cortez, is the center of this industry, and practically all of these products have been shipped through the port of Puerto Cores.

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* W. C. ANDERSON, *Vice-Chairman;* E. F. KELLY, *Secretary;* JAMES H. BEAL, CHARLES H. LAWALL, HENRY M. WHELPLEY, H. V. ARNY, A. G. DUMEZ, H. C. CHRISTENSEN, JULIUS A. KOCH, ROBERT P. FISCHELIS. *Ex-Officio;* L. L. WALTON, President; Vice-Presidents, W. C. ANDERSON, CLYDE L. EDDY; E. F. KELLY, Secretary; C. W. HOLTON, Treasurer; WILLIAM D. JONES, Chairman of the House of Delegates. Editors of the JOURNAL and YEAR BOOK: E. G. EBERLE and A. G. DUMEZ. Committee on Publications: A. G. DUMEZ, *Chairman;* R. P. FISCHELIS, H. V. ARNY, H. M. WHELPLEY, E. F. KELLY, C. W. HOLTON, E. G. EBERLE.

Collaborators: The Members of the Council; the Editor of the YEAR BOOK, A. G. DUMEZ; E. FULLERTON COOK; Chairman, U. S. P. Revision Committee; W. L. SCOVILLE, Chairman, N. F. Revision Committee; the Chairmen of the Sections, A. PH. A.: F. F. BERG, J. G. BEARD, H. C. NEWTON, AMBROSE HUNSBERGER, L. K. DARBAKER; WILLIAM D. JONES, Chairman of the House of Delegates, A. PH. A.; EDWARD H. KRAUS, President, A. A. C. P.; CHARLES B. JORDAN, Chairman Executive Committee, A. A. C. P.; M. N. FORD, President, N. A. B. P.; HENRY C. CHRISTENSEN, Secretary, N. A. B. P.

LIBRARIES.

The reconstructed University of Louvain Library will be dedicated in June or July. Quite a number of universities, individuals, etc., of this country have contributed to the reconstruction of the Library and these have been invited to participate in the dedication.

The work of the Public Library in Washington, D. C., is to be broadened and a bill in Congress provides that the Library shall consist of a central department and a number of branch libraries so located that they will be of greatest service. The Library is to supplement the educational system of the District, but all persons who are permanent or temporary residents of the District of Columbia are entitled to the advantages of the Library.

Students of the Wisconsin Library School will gain experience in a number of cities throughout the state. These students are assigned by the University and they do reference work and collect data as part of their studies.

John L. McCabe, of the Secretarial Staff of the White House, is compiling a collection of newspaper pictures and stories of the President and Mrs. Coolidge which will later serve for historical data.

Mme. Helene Schen-Riesz of Vienna, who is now in this country, contends that great educational work is possible by libraries and books, and this thought should enter into the service rendered by libraries.

When the new Sterling Memorial Library at Yale University is completed it will provide a home for all of Yale's valuable collections which are now distributed in different buildings. Yale's collection of bound volumes and newspapers probably is the largest in any university of this country.

Systems of motor libraries have been organized in various parts of the country so as to supply those living at a distance from libraries and also for the convenience of suburban population.

In the new building of the Institute of France, in New York City, there is a library of about 30,000 volumes. A novel idea for a museum is to be developed here, in which each room is to be fitted out as a livable memorial to a certain period in French decoration; also American scientists are to be kept informed relative to the work being done in French laboratories.

Stewart Edward White, the novelist, says that the function of a museum exhibit is, in essential, to make visually familiar to the people that with which they are not acquainted.

ADDITIONAL SUBSCRIPTIONS FROM SCHOOLS AND ASSOCIATIONS.

The Nebraska School of Pharmacy has sent in fifty new subscriptions to the Headquarters Fund, totaling about $500,000 more than already subscribed.

A letter received from Prof. A. B. Lemon, Buffalo University School of Pharmacy, reads as follows:

"I am including herewith a few more subscriptions to the Headquarters Building. These represent the subscriptions of our three fraternities, as well as students that were not present the day you were here. The delay in getting these to you has been the result of the illness of the President of the class. Shortly after your appearance before our senior class, the President was injured in a football game, which injury put him in the hospital for a period of seven weeks. Immediately upon his return, he solicited the balance of the class, and I believe that we can now honestly say that we are one hundred per cent."

The following letter from Treasurer C. H. Packard, of the Boston Druggists' Association, reads:

"At the fiftieth anniversary of the Boston Druggists' Association, it was voted to contribute three hundred dollars to the building fund of the A. PH. A. headquarters building and I enclose check in full."

HOSPITALS FOR THE COUNTRY.

Hospitals are being established everywhere and recent developments indicate a growing interest in farming centers. This should induce pharmacists who help in these undertakings to see that pharmacists are given proper place in these institutions. The article by Dr. Goeckel, in the February JOURNAL, is attracting attention. We have before us a letter from one our fellow-members, Earl E. Pugh, of Mobile, who refers to the article and expresses the hope that pharmacists may be given rightful place and recognition in hospital service.

Hospitalization of rural communities is the latest activity to be undertaken by the Commonwealth Fund, and, according to Press statements, a definite beginning is announced in the selection of Farmville, Va., as the site of one of the two institutions to be authorized this year.

"A division of Rural Hospitals is henceforward to take a foremost part in supplying what all observers agree to be a crying need of communities that lie outside urban areas. Conditions that tend to lower the standards of health in country districts are aggravated by the diminishing supply of competent physicians. A modern and well-equipped hospital would be a stimulus to the rural practitioner to improve his knowledge, and offset a powerful incentive that draws progressive and ambitious doctors to the cities. Apart from all this is the recognized necessity for hospitals, in rural as well as urban communities, where serious diseases and accident cases can receive efficient treatment. Improved roads tend to facilitate the speedy and safe removal of patients from the farthest confines of a county to a converging point where the hospital may be located.

"Applications for the contruction and equipment of hospitals are subject to one condition, that the local community shall pay one-third of the cost, and provide operating and maintenance expenses."

PERSONAL AND NEWS ITEMS.

W. Bruce Philip, Past-chairman of the House of Delegates, A. PH. A., spoke at the Luncheon of the San Francisco Commonwealth Club of California, February 11; his subject was "Pharmaceutical Aspects of Public Health."

Oliver Atkins Farwell added another contribution to "Botanical Gleanings in Michigan." We are in receipt of a reprint from *The American Midland Naturalist.* The botanical notes are full of interest and value and with them are items which remind one of past experiences encountered in jaunts. One of these references will have to suffice—"On May 6th we were overtaken by a snowstorm of short duration near Milan. Mostly the day was characterized by frequent showers of cold rain. We were rewarded by finding Ginseng, not yet in flower, and *Trillium cernum* var. *declinatum* and its color forms, all in abundance. * * * We observed some cottonwood trees in excellent fruit but were unable to collect specimens as the trees were too large to shin up the trunk where the fruit was."

Benjamin Gagliano, who is an active worker in the Italian Pharmaceutical Association of New York, of which he is first Vice-President, is also editor of its publication, *Monthly Reportorical,* recently established.

Dr. Robert P. Fischelis was the speaker of the evening at the meeting of the Philadelphia Branch, A. PH. A., March 5. His subject was "Pharmacy's Message to the Public." He outlined the results of five years of effort in creating a better public opinion of pharmacy and discussed successful methods of publicity applicable to national, state and local pharmaceutical associations and outlined a plan for future publicity activities.

Margaret Cousins of Dallas, daughter of **Walter H. Cousins** of the *Southern Pharma-*

ceutical Journal, a senior in the University of Texas, has the distinction of being the only girl in school who is an issue editor on *The Daily Texan*. Miss Cousins handles the paper on her night with much executive ability and technical knowledge. In addition to being an honor roll student, she is interested in many student activities, and also is on the Students' Assembly.

Edwin Boberg, of Eau Claire, Wis., has been appointed by Governor John J. Blaine to succeed his father, the late Otto J. S. Boberg, on the State Board of Pharmacy.

Dr. W. W. Charters, Director of the Commonwealth Study of Pharmacy, in his book "How to Sell at Retail" says: "Salesmen are not employed primarily to make money for the firm, or even to earn their own living. Their real business is to see that the customer is satisfied. For if the customer is satisfied the firm WILL make money and the salesman WILL make a living. If the customer is not satisfied the firm will fail, and the salesman will lose his position. Therefore, keep your eye on the customer."

William T. Vanpelt and **Harry W. Brown,** retail pharmacists of Richmond, Va., are using good publicity in Richmond papers and also keep the doctor advised relative to their messages in the Press. The first of the articles acquaint the public with the professional service of pharmacists, succeeding messages emphasize the first by giving a brief history of the progress of medicine and pharmacy, and another tells the reader why it is best to seek the advice of a physician for ailments and that the pharmacist is as necessary for his good health as the former, as prescriptionist.

Prof. Dr. Alexander Tschirch, Director of the Pharmaceutical Institute, University of Berne, since March 1890, and an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1910, will celebrate his seventieth birthday October 17, of this year. His has been an extremely useful life in the interest of pharmacy, chemistry, botany, and pharmacognosy; he would be a welcome visitor at the A. PH. A. meeting in Philadelphia.

Preparations are being made for the celebration of Dr. Tschirch's anniversary in which pharmacists and other scientists from all parts of the world will participate. It is also contemplated to issue a memorial volume. Among those on the Call for the celebration the following well and favorably known American pharmacists are named: Dr. H. V. Arny, Dr. Edward Kremers, and Prof. Otto Raubenheimer. Those desiring to contribute to the memorial volume can send their subscriptions to one or the other of the latter.

Alfred De Lang retired from active retail pharmacy recently, after sixty years of active service. In his honor a testimonial dinner was held at Hotel Gibson, February 9, arranged for by the Cincinnati Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, the Ohio Valley Druggists' Association and the American Druggists' Fire Insurance Co.

A most interesting and largely attended banquet was presided over by Frank H. Freericks. **Dr. William C. Anderson** spoke feelingly of his acquaintanceship with the guest of honor. **Prof. J. N. Lloyd** responded to the toast, "De Lang the Civil War Veteran." **Dr. James H. Beal** paid a tribute to him as a citizen and pharmacist. Presentation speeches were made by Harry Schmuelling and others. The Committee in charge of the arrangements were **Messrs. Charles Ehlers, Milton Franken, Edward Ross, Jr.,** and **Frank H. Freericks.** Congratulatory greetings were extended by **H. E. Igler, Harry Dornhaggen** and **Charles H. Avery.**

Harry G. Schmuelling was the principal speaker at a meeting of the Dayton Druggists' Association on February 10. His subject was "How to be Successful in the Drug Business."

Dr. William Bateson, eminent British biologist, died February 8. He visited in this country in 1922, at which time he delivered the "Joseph Leidy Memorial Lecture" at the University of Pennsylvania.

The British Minister of Health, Sir George Buchanan, recently was the guest of Surgeon General Hugh S. Cumming. Both were decorated by the Polish Government for their aid in improving health conditions in Poland.

Dr. Gaston Raymon and Dr. Christian Zoeller of the Pasteur Institute have developed a serum which is said to provide durable immunization against tetanus.

Dr. Francis Carter Wood, Director of the Cancer Research at Columbia University, has according to the Press expressed his belief that fifty out of two hundred and sixty hopeless cases of cancer under treatment by Dr. Blair Bell in Liverpool have been cured. He cast some doubt upon the reported discovery of the cancer germ and also stated that Dr. Gye would be the last man to assert that the microbe had been definitely found. At the

present time only hopeless cancer cases are being given the treatment by Dr. Bell in Liverpool, as sufficient progress has not been made in the treatment to warrant a more extended application of it.

Sir William S. Glyn-Jones is now located at the Canadian P. A. T. A. where he is engaged in developing the organization and operations of the newly-formed association. Sir William is to be back in London at the end of next April. We hope that Sir William will return in time to attend the A. PH. A. Convention in Philadelphia.

J. A. Kenningham, Secretary and Treasurer of the Association of Manufacturers of British Proprietaries, has been elected Honorary Treasurer of the P. A. T. A. to succeed George Barclay. Mr. Kenningham visited the U. S. last year with Sir William S. Glyn-Jones.

T. N. Jamieson, founder and patron of the C. V. D. A., and Life Member of the AMERICAN PHARMACEUTICAL ASSOCIATION, has written a most interesting letter to Past-President Henry M. Whelpley, in which he gives brief sketches of a number of the members of the C. V. D. A., among them of the late Albert E. Ebert and C. S. N. Hallberg.

Rudolph E. Rhode recently was quite seriously hurt when he was struck by a taxicab, which necessitated hospital attention. Another Chicago veteran, **Albert Miller,** had to undergo a serious operation and was confined to the hospital for about six weeks. Both of the latter are improving nicely.

It may be said the members of the C. V. D. A. are almost to a man deeply interested in other organizations that pertain to pharmacy; in other words, they believe in associations.

Dr. Elson of the University of Wisconsin, Physical Education Department, gave an address on "first aid" measures to the class in Drug Store Practice, on March 5. **Edward Williams** spoke to the same class on "Organization Activities." **H. G. Ruenzel** spoke to them on changes in U. S. P. X and **E. G. Raeuber** on propaganda.

Prof. Jeannot Hostmann, of the faculty of New York College of Pharmacy, and Secretary of the New Jersey State and Hudson County Pharmaceutical Associations, has been seriously ill for several months, but he is now on the road to recovery.

Many of the older members will remember the late Polk Miller, of Richmond, Va., who contributed largely to the enjoyment of several A. PH. A. conventions. His widow died at Bon Air, her country home, in January. A son, W. Withers Miller, is the proprietor of Stuart Circle Pharmacy, of Richmond.

TWENTIETH ANNIVERSARY OF AMERICAN DRUGGISTS' FIRE INSURANCE COMPANY.

The 20th annual meeting of the American Druggists' Fire Insurance Company was held in Cincinnati February 8–9. The annual report showed an increase in assets to over $1,500,000. The vacancy caused by the death of Lewis C. Hopp was filled by the election of J. S. Rutledge of Akron, Ohio, and D. William C. Anderson, of Brooklyn, was elected a member of the Executive Committee; all officers were reëlected.

January 1, the Company had 20,762 policies in force, with a total insurance of $57,919,312. During the year $208,866.60 was paid in fire losses.

The 20th Anniversary Celebration of the Company will be held during the last week of May, at which time all the officials and State Agents will be in attendance. It was voted to extend special invitations to the President and Secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION and of the National Association of Retail Druggists to be present during the meeting. It has been decided to erect the Home Office Building. Messrs. Avery, Anderson, Beal, Heinritz, Rothwell, Young and Freericks constitute the Executive Committee.

The sixth annual dinner of Fritzsche Brothers, Inc., of New York, was held February 6, at Hotel Pennsylvania. Each year has marked the addition of firm officials or representatives to the "Twenty-five Year Club"—this year Benedict F. Zimmer, of Chicago, and George L. Ringel, of Columbus, joined the list. The dinner, speeches and music were followed by a dance.

The February number of the *Maryland Pharmacist* is the Maryland Association Proceedings number. The President, Samuel Y. Harris, graces the issue, a group picture of the 1925 meeting is inserted and adds a lively interest. All laws relating to pharmacy of Maryland are included, also a list of members, of registered and assistant pharmacists, associate and life members and T. A. M. P. A. members. The number contains more than 300 pages and serves as a most useful reference for every Maryland drug store.

OBITUARY.

WALTER M. FROHWEIN.

In the February number of the JOURNAL brief mention was made of the death of W. M. Frohwein. The deceased had been in poor health for a number of years. He was born in Elizabeth, N. J., which was his home at the time of his death, and here he had conducted a pharmacy for many years. He received his early education in Elizabeth and graduated from the New York College of Pharmacy.

Mr. Frohwein was a member of various fraternal organizations and interested in associations connected with pharmacy.

His wife, one daughter, and a brother, Richard Frohwein, survive the deceased.

ERNEST GARDNER SWIFT.

E. G. Swift, up to his retirement about three years ago Secretary and Comptroller of Parke, Davis & Co., died in Pasadena, Calif., on January 30, aged 65 years.

Mr. Swift received his early education in Rawdon, Quebec, where he was born, and prior to his graduation from the Montreal College of Pharmacy, in 1883, was employed by Lyman Sons & Co. Soon after graduation he entered the employ of Parke, Davis & Co. and worked his way slowly to its most responsible positions. While in charge of the Laboratories in Walkerville, Ont., he served three terms as Mayor and for several years as a member of the City Council. He was a member of the Masonic bodies and of a number of the Clubs in Detroit.

Mr. Swift is survived by his widow and three sons, two of whom are members of Cope-Swift Co., of Detroit. The other son resides at Wellesley Hills, Mass.

FORESS B. LILLIE.

F. B. Lillie, for a number of years an active member of the AMERICAN PHARMACEUTICAL ASSOCIATION, and a pioneer settler and druggist of Oklahoma, died at his home in Guthrie, February 24.

Mr. Lillie came to Guthrie from Girard, Kansas, on the first day that Oklahoma was opened to settlement. He helped found the city of Guthrie and opened the first drug store in Oklahoma, which he conducted up to the time of his death. He was active for many years in municipal and state affairs and was the first Secretary of the Oklahoma Board of Pharmacy.

LEONARD RANSOM WAGENER.

Leonard Ransom Wagener, instructor in the College of Pharmacy at University of Michigan, died February 14, in a local hospital after a short illness.

Mr. Wagener was born in Grand Rapids, August 13, 1883, and entered University of Michigan in 1917, coming from Bangor, where he had owned a drug store. He received his Ph.C. degree in 1920 and his B.S. degree in 1921 and was appointed instructor in the same year. In 1924, Mr. Wagener received his M.S. degree. He was a member of the Phi Delta Chi, Rho Chi, Sigma Xi, and Phi Lambda Upsilon fraternities, AMERICAN PHARMACEUTICAL ASSOCIATION (since 1915), Junior Research club and the Masonic lodge.

He is survived by the widow and three brothers, one residing in Grand Rapids and two in California.

SOCIETIES AND COLLEGES.

Pharmacy is developed by the purposes we form, the conceptions that we entertain relating to pharmacy, the hopes for it that we cherish. It grows through our visions in the things that we purpose for it. Let us have it grow in our hopes and for the benefit of mankind.

PHI DELTA CHI.

The twenty-sixth Grand Council of Phi Delta Chi (formerly Phi Chi) was held at the Allerton Club, Chicago, on February 10, 11, 12 and 13, 1926. It was attended by about sixty members of the fraternity. I. H. Robitshek of Minneapolis, Past-President, was toastmaster at the annual banquet.

New chapters at the University of Maryland and the Medical College of Virginia were represented for the first time. The next Grand Council will be held in Memphis in February 1927. Special efforts will be made to have as guests of honor next year several of the original charter members of the mother chapter, Alpha, located at the University of Michigan.

The National History-Directory of the fraternity is rapidly approaching completion and

will be ready for sale about the middle of the year. It will sell for $4.00 per copy and may be ordered from the Grand Secretary.

The national officers elected are: Grand President, Edward Spease of Cleveland; Grand Vice-President, J. E. Galloway of Des Moines; Past Grand President, Emory W. Thurston of Los Angeles; Grand Treasurer, C. V. Nichols of Richmond, Va.; Grand Secretary, L. C. Heustis, 1662 Bellefontaine St., Indianapolis; Editor-in-Chief of the *Communicator* and *Communicalendar*, R. P. Hollenback of Columbus, Ohio.

In addition to the officers listed above, the meeting was also attended by the following: Dr. E. L. Newcomb, Dr. D. C. Frise and Byron Farley of Minneapolis; L. E. Harris of Madison, Wisc.; W. G. Gaessler of Ames, Ia.; C. F. Poe of Boulder, Colorado; G. K. Finzel, H. E. Noel and Ray Mills of Ann Arbor, Mich.; W. L. Cunningham of Chicago; E. P. Johnson of New York City; L. H. Ohmart of Boston; Chas. Huenneke of San Francisco; Russell Seitz of Galveston; L. J. Grimm, J. A. Dixon and J. G. Cook of Pittsburgh; J. J. Pfiffner and A. H. Boeke of Iowa City; Russell Neely and J. L. Swope of Los Angeles; Newman Thurston, A. A. Anderson and Kurt Mueller of Columbus, Ohio; Paul Quick, Eric Sonnich, F. L. Gerin, L. H. Blanchard of Lafayette, Indiana; H. E. Keller of Lawrence, Kansas; Carl Holst of Omaha, Nebr.; Prof. L. S. Blake and Russell Wilson of Auburn, Ala.; W. T. Schnabel of Baltimore; H. E. Rise of Des Moines; Dr. R. L. Crowe of Memphis; T. H. Highland and George W. Brown of Cleveland; E. M. Rhea and Carl Nall of Louisville; G. E. Henderson of Chapel Hill, N. C.; L. T. Turner and J. L. Ireson of Richmond, Va.

AMERICAN DRUG MANUFACTURERS' ASSOCIATION ANNUAL MEETING.

The annual meeting of American Drug Manufacturers' Association will be held at Hotel Biltmore, New York City, April 12–15.

The scientific section will meet at 10 A.M., April 12, and receive reports from the following sub-committees: Alkaloid and drug standards (includes male fern), chemical tests and standards, control assays, crude and milled drugs, digestive ferments and glandular products, diluents and excipients, drug extracts, essential oils, pharmacological assays, synthetic organic chemicals, surgical dressings and plasters.

L. E. Warren, now of the Bureau of Chemistry, will address the convention on the first day of the meeting on "The Project for Drug Research by the U. S. Bureau of Chemistry."

Mr. Warren will outline the work that is being carried out under his direction and what has been accomplished thus far in the comprehensive research program inaugurated by the Bureau of Chemistry. The drug research unit has no direct part in the administration of the food and drugs act, but furnishes the background for enforcement activities by supplying reliable methods of analysis. The plan of procedure adopted places first on the list those drugs which appear to be in greatest need of early investigation. Briefly it is as follows: (1) Alkaloids, their salts, and local anesthetics; (2) anthraquinone drugs; (3) organic compounds, including synthetics (except local anesthetics); (4) oils (*a*) fixed, (*b*) volatile; (5) gums and resins; (6) glucosides; (7) vegetable drugs (crude drugs, etc.) (*a*) chemical methods of assay and identification; (8) inorganic compounds; (9) glandular preparations, ferments, etc.

BULLETIN DE LA FÉDÉRATION INTERNATIONALE PHARMACEUTIQUE.

At the annual meeting of the Fédération Internationale Pharmaceutique, of which the AMERICAN PHARMACEUTICAL ASSOCIATION also is a member, held in Lausanne, Switzerland, in 1925, it was decided to publish a *Bulletin* to be issued quarterly. The first number will be published soon and will contain a paper by Prof. Otto Raubenheimer, Brooklyn, on "Pharmacy in the United States."

MEETING OF AMERICAN CHEMICAL SOCIETY IN TULSA.

The American Chemical Society will hold its Spring Meeting in Tulsa, Okla., April 5–8. All papers before the general meeting, divisional meetings; or meetings of local sections, are the property of the American Chemical Society unless released by the Society's editors. No paper already offered for publication in other journals should be offered for the program. If release is desired, address the editor of the appropriate journal— *i. e.*, H. E. Howe, A. B. Lamb, W. D. Bancroft, or Neil E. Gordon. The editors will act promptly on any release requested when the paper is in their hands.

Excursions will be arranged to the oil fields and refineries, glass and cement works, and lead and zinc smelters. Visits also may be

made to the salt, gypsum and coal districts near Tulsa.

MEETING OF AMERICAN MEDICAL ASSOCIATION IN DALLAS.

The American Medical Association will convene in Dallas, April 19–25. A display will be made of U. S. P. preparations following the plans of the Atlantic City Meeting and will be in charge of Baylor University, Medical Department, including the School of Pharmacy. After the close of the convention excursions through the state and to Mexico will be arranged for under the direction of the Texas members.

WORLD CONFERENCE ON NARCOTIC EDUCATION.

An invitation, presented through Mr. Richmond P. Hobson, President of the International Narcotic Education Association, to the American Medical Association to be represented at a world conference on narcotic education, to be held in coöperation with the Sesqui-Centennial International Exposition, at Philadelphia, July 5–10, 1926, was submitted and considered by the Board of Trustees A. M. A., February 19. It was the sense of the Board that this invitation should be declined, and that the Association should not be represented at the proposed conference.

An invitation was received from the China Medical Association, to be represented at its meeting to be held in Peking, Aug. 31–Sept. 8, 1926. Dr. Charles H. Frazier of Philadelphia, who is to be in China at the time of the meeting of the China Medical Association, was appointed to represent the American Medical Association at that meeting.

AMERICAN METRIC ASSOCIATION.

The District of Columbia section of the American Metric Association met February 17 for the purpose of promoting interest in the bill sponsored by Representative Britten of Illinois, providing for adoption of the metric system in the United States by January 1, 1935. The speakers at the meeting included Dr. Charles L. Parsons, Secretary of the American Chemical Society, and Dr. Harvey W. Wiley, formerly chief of the bureau of chemistry of the United States Department of Agriculture.

VETERAN DRUGGISTS MEET.

The guest of honor at the Chicago Veteran Druggists' Association's round table, Thursday, February 11, was Prof. H. V. Arny, of Columbia College of Pharmacy, New York, and President of the New York Veteran Druggists' Association, who stopped off in Chicago on his return from the meeting of the Minnesota Pharmaceutical Association. The birthday celebrant on this occasion was Richard Merz. "Dick" was officially toasted by George Wright. Tributes were paid to the celebrant by Fraters Henry, Matthes and Haering, with edgewise remarks by Wilhelm. Professor Arny gave a most interesting talk, which was both serious and humorous. He referred to the splendid veteran's organization in existence in New York City and extolled Wilhelm Bodemann for his efforts in having organized throughout the country veteran associations and promoting the spirit of "veteranism." Letters were read from Founder Jamieson, who has been ill for the past two weeks, and Tom Potts.

The Minneapolis Veteran Druggists' Association gathered with friends and veterans from other localities at the round table at the Curtis hotel at 1 P.M., Thursday, February 11, about one hundred being in attendance. Charles H. Huhn presided, with A. J. Kline recording. Five birthdays were celebrated, Matt Wittich, Geo. W. Bush, E. B. Wilson, John R. Loes and C. A. Robinson being the celebrants. Recording Secretary A. J. Kline introduced a novel feature by bringing with him two enlarged sketches of President C. D. Johnson, one as a "callow" youth, the other up-to-date. They were both pronounced good likenesses. Mr. Kline stated that fifty years intervened between the pictures. The chairman called on many visitors and veterans for remarks, all responded in good old veteran style. Carl Weeks made his initial talk to the Minneapolis Veteran Druggists' Association and their visitors. "The Quality of Veteranism" by Dr. J. H. Beal, dedicated to the Chicago Veteran Druggists' Association, of which he is a member, was read by Secretary Kline and ordered filed in the records of the Minneapolis Veteran Druggists' Association.

SECTIONAL TEXAS DRUGGISTS' ASSOCIATIONS.

The Northwest Texas Druggists' Association was organized at Paris, February 4. N. H. Campbell, Paris, was elected *President;* E. R. Stiles, Clarksville, *First Vice-President;* Lonnie Hooten, Cooper, *Second Vice-President;* R. F. Murphy, Paris, *Secretary;* Hoyt Jenkins, Paris, *Assistant Secretary;* John B. Little, Honey Grove, *Treasurer.*

There were present at the meeting, which was followed by a banquet from other sections of the state: President W. E. Greiner, of the N. W. D. A., Dallas; Walter D. Adams, Secretary of Texas Pharmaceutical Association; Walter H. Cousins, of the *Southern Pharmaceutical Journal* and Secretary of Texas Board of Pharmacy; O. O. Lumpkin, former President of Arkansas Association of Pharmacists; F. Williams and E. C. Scott of Dallas, H. A. Bredow of Fort Worth.

The Lamar County Medical Association, being in session in Paris, was invited to the banquet and a general "get-together" meeting was the result. The principal address on the part of the medical men was made by Dr. Curtis Rosser, of Dallas; other talks were made by Oscar Payne, editor of the Paris News, and the visitors named.

The Lower Rio Grande Valley Retail Druggists' Association was formed January 26, at Casa de Palmas. The organization was effected through the coöperation of R. L. Reeder, Assistant Secretary of the Southwest Retail Druggists' Association. Richard Sharp, of McAllen, was elected *President;* Forest Powell, Weslaco, *Vice-President,* and H. G. H. Weinert, of Brownsville, *Secretary-Treasurer.* The membership committee is composed of Richard Henderson, Frank Willis and H. C. Alston.

The next meeting of the Association will be held in Brownsville.

These sectional associations will coöperate with the State Association.

BALTIMORE RETAIL DRUGGISTS' ASSOCIATION.

The Tenth Annual Banquet of the Baltimore Retail Druggists' Association was held on Thursday, February 25, 1926, at the Hotel Rennert and added one more to the number of brilliant affairs furnished by this progressive organization. The main dining room of the hotel was utilized for the dinner, and it was filled to capacity with hundreds of happy, jovial pharmacists and traveling men. Drawings for prizes occurred after the repast had been served, and every person successful in the drawing received a gift, from some manufacturer or wholesaler, that was very acceptable, many of them being quite valuable. The entertainment was an outstanding feature of the evening, and consisted of songs, dancing, monologues and black-faced comedian stunts. The Police Quartet was furnished through the courtesy of General Charles D. Gaither, Police Commissioner, and this portion of Baltimore's finest gave a most delightful account of themselves. They sang many times to continuous applause—Messrs. Eugene Hargadon, Raymond Kildruff, Bernard Roche and Howard Wortman constituted the quartet, and will always be welcome in any gathering of Baltimore druggists.

The speakers for the evening were: Hon. Howard Jackson, Mayor of Baltimore; Editor E. G. Eberle, of the JOURNAL OF THE A. PH. A.; Dr. A. G. DuMez, Dean of the College of Pharmacy, University of Maryland; Hon. S. Y. Harris, President of the Maryland Pharmaceutical Association; and member of the Baltimore City Council.

The District of Columbia Retail Druggists' Association was represented by the following following well-known Washington pharmacists: Paul Pearson, W. H. Bradbury, E. W. Whiteside, S. L. Hilton, H. C. Easterday, Norman Parker, Wm. P. Herbst, A. F. Gorsuch J. French Simpson, A. Berger, making what a distinguished Washington druggist would call a "wonderful" delegation.

The Banquet Committee, which was also an entertainment committee, is composed of veterans, everyone of whom has served in this capacity many times. The members are as follows: M. Strasburger, *Chairman;* P. J. Boenning, Charles L. Meyer, William G. Lauer, S. Y. Harris, G. P. Hetz and William H. Pensel.

The officers of the Association are: R. E. L. Williamson, *President;* Charles Morgan, *First Vice-President;* Charles Knight, *Second Vice-President;* J. A. Gerlach, *Third Vice-President;* M. Strasburger, *Secretary;* P. J. Boenning, *Treasurer;* William H. Kratz, *Recording Secretary.*—Part of a report from the *Maryland Pharmacist.*

DISTRIBUTION OF NATIONAL FORMULARY V.

The Chemical Catalog Company, 19 E. 24th St., New York, N. Y., has been awarded the contract for the distribution of the National Formulary. The Company will appoint a number of sub-agencies, and all orders for N. F. V should be addressed to the distributors or the agents. The AMERICAN PHARMACEUTICAL ASSOCIATION does not sell the Formulary, this part of the work and the publicity being contracted for as above indicated. The date when the N. F. V will become official is soon to be announced.

PHARMACIST AND THE LAW.

ALCOHOL TAX REDUCED.

The report of the conference committee on the revenue bill of 1926 has been adopted by both houses of congress and signed by President Coolidge. Besides reducing normal and surtaxes on incomes, reducing the estate tax and granting relief along numerous other lines, the act provides for reducing the tax on distilled spirits of alcohol from $2.20 per proof gallon to $1.65 a gallon beginning January 1, 1927, and to $1.10 a year later. There is provision for a tax of $6.40 per proof gallon on alcohol diverted to beverage use. Denatured alcohol, of course, continues exempt from taxation.

The bill makes the internal revenue tax apply on imported spirits in addition to the customs tariff duty. Smuggled and seized spirits are declared to be imported within the meaning of the act. However, smuggled alcohol may be sold under the terms of the act to industrial alcohol plants for denaturing, or redistillation and denaturation without the payment of the internal revenue tax. The bill lifts government liens from premises formerly used for distillery purposes.

THE LATTIN BILL IN NEW YORK LEGISLATURE.

At the request of the legislative committee of the New York State Pharmaceutical Association, Assemblyman Frank H. Lattin has introduced a bill in the New York State Legislature to amend the public health law by providing that no pharmacy, drug store or other store having a permit to sell intoxicating liquor shall be registered by the State Board of Pharmacy. The bill does not, however, prohibit the lawful possession, sale and use by licensed pharmacists or druggists of any United States Pharmacopœia or National Formulary preparation other than whisky and brandy. The bill, fostered by the State Pharmaceutical Association, is in line with a resolution adopted at the last convention of that body relative to the establishment of government dispensaries for the distribution of liquor and restoring to pharmacists and druggists the free use of alcohol for pharmaceutical purposes only.

ANDREWS SEEMS TO FAVOR GOVERNMENT DISPENSARIES.

According to the correspondent of the *Oil, Paint and Drug Reporter*, Assistant Secretary of the Treasury, L. C. Andrews, has indicated that ultimately the government will have to own the whisky supply of the country for medicinal purposes, although he has not made up his mind about the practicability of carrying out a plan for acquisition of these supplies at this time. It is learned that he has a committee of business men and lawyers working on the problem. Mr. Andrews has stated that he is "interested keenly in the distribution to retail druggists," of medicinal whisky, without diversion, and with the assurance that druggists would always have pure whisky. He has been informed that many retail druggists are voting, in a canvass, that the government should relieve them of the handling of medicinal whisky, but at the present stage Mr. Andrews does not see his way clear to approve a suggestion that the government should establish agencies for distribution of medicinal liquor direct to the consumer. A year or two ago there was a suggestion that the public health service take over the whisky supply and be responsible for its proper distribution for legitimate purposes.

SEPARATE BUREAUS.

The Assistant Secretary of the Treasury has endorsed the principle of a prohibition bureau separate from the internal revenue service, which was embodied in the Cramton bill as well as in the administration's new bill providing for bureaus of prohibition and customs.

Views of Secretary Mellon and of General Andrews, according to the Press, differ on a number of propositions. As a result of these differences there is considerable speculation in Washington as to whether General Andrews, when he goes before the House Committee, will advance formally his proposal for a Presidential prohibition committee. Officials wonder how the committee would receive recommendations from the Treasury that did not have the backing of the head of the department.

General Andrews thinks that a thorough investigation of prohibition should include the economic and sociological aspects of the problem. Mr. Mellon thinks that an investigation would not make any change in public opinion, as people have settled views on the question one way or the other, and it would be very difficult to find investigators in whom the public would have confidence.

FOREIGNERS INQUISITIVE.

General Andrews is embarrassed by the fact that foreign nations are continually asking for

information as to how prohibition is working in the United States. He has no official data to furnish them and thinks that a commission could supply that want. Mr. Mellon thinks that everybody knows how prohibition is working. He thinks conditions throughout the country are more or less evident.

Mr. Mellon does agree with General Andrews on one point. They both think that a Congressional investigation would be helpful. Mr. Andrews thinks such a probe would develop facts about prohibition that the Treasury does not have the machinery to uncover. Officials did not make clear exactly why Mr. Mellon thought a Congressional probe would be of value when an investigation by a Presidential prohibition commission would not.

TO PREPARE QUESTIONNAIRE.

Meanwhile the House Committee on Alcoholic Traffic is going ahead with the preliminary moves of an investigation. A sub-committee headed by Representative Upshaw, Democrat, Georgia, has been appointed to prepare a questionnaire.

VIRGINIA LEGISLATION.

Secretary A. L. I. Winne has sent out the circular of advice on Virginia legislation. The cosmetic and soda tax bills have been killed.

The Caustic Alkali Bill is on its second reading on the House Calendar, where it has been for some days.

The Peddlers' Bill has not progressed since last reports. It was then in the hands of a sub-committee for consideration.

The Registered Assistant Bill, introduced by Mrs. Fain of Norfolk, amends several sections of the pharmacy law with reference to the registered pharmacist. Its purpose is to prevent the registering of any more assistant pharmacists after March 1, 1926, to allow such persons as are registered as assistants now to take the registered pharmacist examination for the purpose of registering as pharmacists if they can pass the examinations. It does not affect the status of those registered as assistant pharmacists, allowing them to continue to practice as such after March 1, 1926, if they do not subsequent to that date become registered as pharmacists.

NEW YORK X-RAY LABORATORY LAW AMENDED.

Commissioner Louis I. Harris reports in the City of New York Department of Health *Bulletin* for February 13, that the regulation anent X-ray laboratories, reading:

> "Every X-ray laboratory shall at all times be in charge and under the direction of a duly licensed physician or *other person whose knowledge, experience and qualifications to operate and use an X-ray machine* are satisfactory to the Health Department."

has been amended to read:

> "Every X-ray laboratory shall at all times be in charge of and under the direction of a duly licensed physician or other person *who is licensed under the laws of this state to diagnose and treat disease* and whose knowledge, experience and qualification to use an X-ray machine are satisfactory to the Health Department."

The comment is made that "thus amended, the regulations will entitle all the members of professions licensed under the laws of the state to diagnose and treat disease to maintain and conduct X-ray laboratories and will safeguard the public from errors of omission or commission that might jeopardize life and health."

BOOK NOTICES AND REVIEWS.

Principles of Pharmacy. By Henry V. Arny, Ph.M., Ph.D., F.C.S., Professor of Chemistry in the College of Pharmacy of Columbia University, etc., 3rd Edition, Revised with 289 illustrations, octavo, 1088 pp. Cloth $8.00—Philadelphia and London, W. B. Saunders Co., 1926.

Just off the press is Prof. Arny's well-known "Principles of Pharmacy" in its third edition. The appearance of the 10th revision of the U. S. P., and the 5th edition of the N. F., at an early date, requires a new edition of the book with the inclusion of not only the new data of the U. S. P. and N. F. but also of the remarkable discoveries in the field of chemistry, medicine and pharmacy that have been made during the past decade.

The seven Parts of this excellent book deal with the following subjects:

I. Pharmaceutic Operations and Appliances. A striking feature is the inclusion of a chapter on the "Arithmetic of Pharmacy."

II. Galenic Pharmaceutic Preparations. It will be noticed that, whenever possible,

these preparations are grouped around a typical pharmacopœial recipe, thus avoiding repetition. Besides the U. S. P. X and N. F. V preparations, the most important unofficial ones are also given.

III. Inorganic Chemistry. This contains an introductory chapter on chemical theories and discusses chemical arithmetic very fully.

IV. Organic Chemistry. This Part begins with a Chapter on "Fundamental Principles." The organic chemicals are grouped according to the latest and most modern classification in a very thorough manner, in 18 chapters.

V. Pharmaceutic Testing. The analytical methods of the U. S. P. X are explained and summarized in five chapters.

VI. The Dispensing of Prescriptions. Here the prescription is taken up from the time it is written until the time it is dispensed.

VII. Laboratory Exercises. This part gives the laboratory work which has been followed with much success by students of the author. A notable feature of this section is the exercise in equation writing and in chemical arithmetic that the work affords. This last chapter is cleverly divided into Galenical and Chemical Preparations. The "spreading of a plaster" on p. 1022 should be best transferred to the Galenicals.

In this systematic manner, Arny presents the "Principles of Pharmacy" in a clear, concise and excellent manner. The author, and all who know him can testify to this, but the happy faculty of presenting even the driest subject in such a clear and interesting way that even a tyro can readily grasp it. The book contains a wealth of information, not only pharmaceutical and chemical, but also therapeutical and technical. As one example I beg to point out the excellent table "Perfumery Chemicals" on pp. 743 and 744 which can be consulted with profit, not only by the student but also by the pharmacist and chemist.

Notable among the other excellent features of Arny's Pharmacy are the following:

1. Tabulated Statements at the end of each Chapter. I want to call attention to the following: Fluidextracts of N. F. V p. 243; Fluidextracts of U. S. P. X assayed chemically, p. 244; Fluidextracts of U. S. P. X assayed biologically, etc.

2. Statement of Doses, arranged as to quantity at the end of each Chapter. This is a great help, especially to the student, in memorizing the doses.

3. Bibliography at the end of each Chapter. The author has rendered here a distinct service to pharmacy, by the compilation of these bibliographic duties. No one appreciates such work if he has not been engaged at it himself. How thoroughly Arny has solved this problem can be seen from the following illustrations: The bibliography on Tinctures, Infusions and Decoctions, p. 232, occupies one-half page; the one on Hydrocarbons and Methane Derivatives, pp. 577 to 579, four and a half pages, the one on Glucosides and Glucosidal Drugs on pp. 643 and 644, about two pages, and the bibliography on Volatile Oils and Drugs on pp. 676 to 680, four pages.

That an immense work of this kind contains a few errors, especially in the first printing, is to be expected. Even our legal standard the U. S. P. X in the second printing has perpetuated the mistake on p. 165 that the mentruum for Fluidextract of Cinchona contains 100 cc. of Hydrochloric Acid instead of Diluted HCl. *Sapienti sat!* The referee begs to point out the following errors:

p. 175. Aq. Camphoræ does not contain Alcohol.

p. 176. Aq. Rosæ is diluted with *Distilled* Water and not Water.

p. 189. The formula for Collyrium Adstringens Luteum does not correspond to Ph. Austr.

p. 213. Infusum Digitalis is not made with *bruised* but with finely powdered Digitalis.

p. 282. Aloes should be Aloe.

p. 283. Triturate should be Trituration.

pp. 296 and 1022. Resin should be Rosin.

p. 1055. Lotio Calaminæ Compositus should, of course, be Composita.

These few errors and "printer's devils" will certainly be corrected in the next printing.

May the referee suggest that the next edition will explain the letters P. I. and the agreements of the Brussels Protocol? Surely this is a very important subject.

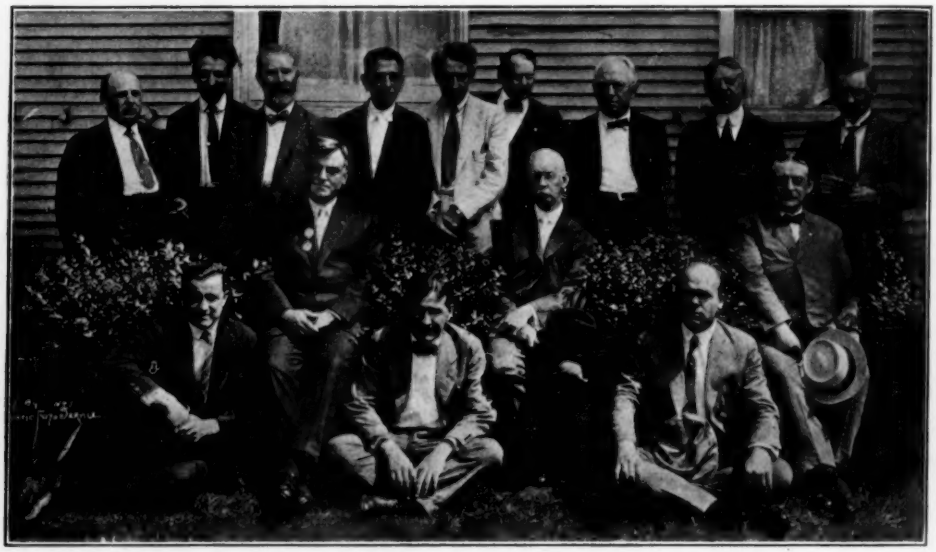
So many authors try to save printer's bills on their index, much to the annoyance and sometimes disgust of the readers. But not Arny! This index is quite unusually detailed and complete and shows careful work. It consists of 50 pages in three columns, and bold-face figures indicate the pages on which the drugs are treated *in extenso*.

What more is there to say? The work is a practical text and reference book, in short a masterwork which will surely be welcomed by students, teachers and pharmacists alike.

OTTO RAUBENHEIMER, PH.M.

THE COMMITTEE OF REVISION,
NATIONAL FORMULARY V.

THE NATIONAL FORMULARY V WILL BECOME OFFICIAL
JULY 1, 1926



COMMITTEE OF REVISION OF THE NATIONAL FORMULARY V.

Left to right, seated—lower three: H. A. B. Dunning, Baltimore, Md.; P. Henry Utech, Meadville, Pa.; E. L. Newcomb, Minneapolis, Minn. Upper three: Leonard A. Seltzer, Detroit, Mich.; Wilbur L. Scoville, Chairman, Detroit, Mich.; George M. Beringer, Camden, N. J. Standing: Herman Engelhardt, Baltimore, Md.; Bernard Fantus, M.D., Chicago, Ill.; Otto Raubenheimer, Brooklyn, N. Y.; S. L. Hilton, Washington, D. C.; Charles H. LaWall, Philadelphia, Pa.; E. Fullerton Cook, Philadelphia, Pa.; Clyde M. Snow, Chicago, Ill.; H. V. Arny, New York, N. Y.; C. A. Farwell, Detroit, Mich.